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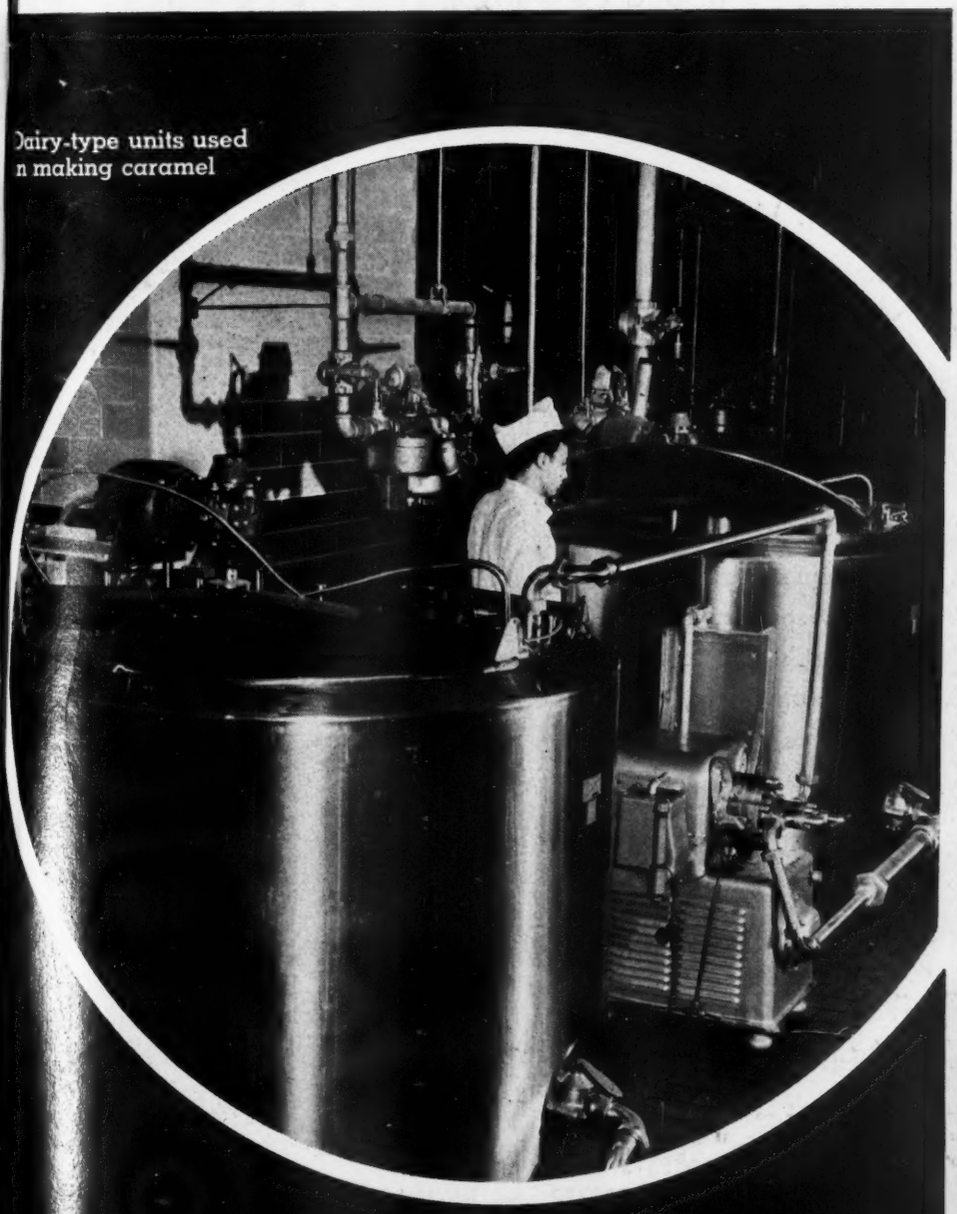
FOOD INDUSTRIES

NATIONAL EDITION

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Dairy-type units used in making caramel

DECEMBER 1948

DAIRY PROGRESS —FI Report

Packaging That Resists Rancidity

Polarized Light In Control Work

Comminuted Apple Juice

Aptitude Tests For Plant Workers

Raising Pineapple For Quality Pack

Meatball Output Raised, Costs Cut

McGRAW-HILL PUBLICATION

May the good smells that mean Christmas surround you

WE hope your whole holiday season is filled with the good smells of happiness . . . Let there be sweet wood smoke for you, from fireplaces with youngsters around them . . . and the spicy smell of busy kitchens, where pies and fat turkeys roast . . . May your house be filled with popcorn smells, apples, oranges, nuts—with the perfumes of loved ones near you making your heart feel glad.

You have helped make our holidays happy. Thank you for all your friendship.

Merry Christmas! A Good New Year!

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FOOD INDUSTRIES

DECEMBER, 1948 Volume 20, Number 12

INDUSTRY INDEX

Baking 67, 82, 96, 129
Beverages 67, 98, 130
Cereals 67, 109, 121
Confectionery 67, 84
Dairy 67, 101, 116, 128
Fruits & Vegetables. 67, 71, 92, 110
Meats and Fish 67, 77
Other Foods 67, 91, 130

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THE COVER—Stainless steel equipment is used for making caramel base in the Bronx, New York, plant of Fanny Farmer Candy Shops. Operator checks on base mix in kettle, prior to homogenization. From holding tank (foreground), base is fed through sanitary pipelines to caramel department on lower floor. See page 84 for story on this plant.

SPECIAL FEATURES
Food Industries Index..... 67
New Straws in Washington Wind.....*F. K. Lawler* 69
Control of Quality and Cost Begins in the Field.....*C. R. Havighorst* 71
Nutritional Improvement Presents Many Legal Problems *F. M. Depew* 112
Scandinavian Food Technology..... 117

PRODUCTION
Output Trebled, Costs Cut in Canned Meatball Operation.*F. C. Ainsley* 77
Quality Apple Juice Made With Comminutor.....*C. R. Havighorst* 92
Vanilla Extract Processing Speeded.....*Robert W. Breidenbach* 118

PERSONNEL
Aptitude-Tested Workers Boost Pretzel Output.....*James L. Dooley* 82

ENGINEERING
Engineering a Better Candy Kitchen.....*Haldane Gee* 84

RAW MATERIALS
Groundnut Project Advances..... 91

PACKAGING
Packaging Materials Which Resist Rancidity.....*G. T. Carlin* 96

SANITATION
Quaternaries Kill Yeasts Found in Carbonated Beverages *S. S. Epstein* 98
Quick Checks on Fumigation.....109

FOOD INDUSTRIES REPORT
The Dairy Industry Makes Significant Advances.....*G. H. Wilster* 101

RESEARCH
Concentrated and Quick Frozen Orange Juice Retains Its Vitamin C *W. R. Roy and H. E. Russell* 110

DISTRIBUTION
All-Steel Milk Trucks..... 116

QUALITY CONTROL
Polarizing Microscope—A Quality-Control Instrument.*Russell N. Bell* 121

CONVENTION REPORTS
Ice Cream Manufacturers . . . American Bakers Assn. . . . Yeast Symposium 128

EVERY MONTH
Editorials .....69 and 125
The Talk of the Industry..... 70
Automotive 116
New Packages and Products..... 132
Food Industry News..... 141
Schedule of Events..... 158
Changes in Food Supplies..... 161
What Washington Thinks..... 162
Men, Jobs and Companies..... 165
Food Equipment News 172
Reader Service Coupons..... 181
Catalogs and Bulletins..... 185
Food Technology—Abstracts..... 191
Books 205
Patents 209

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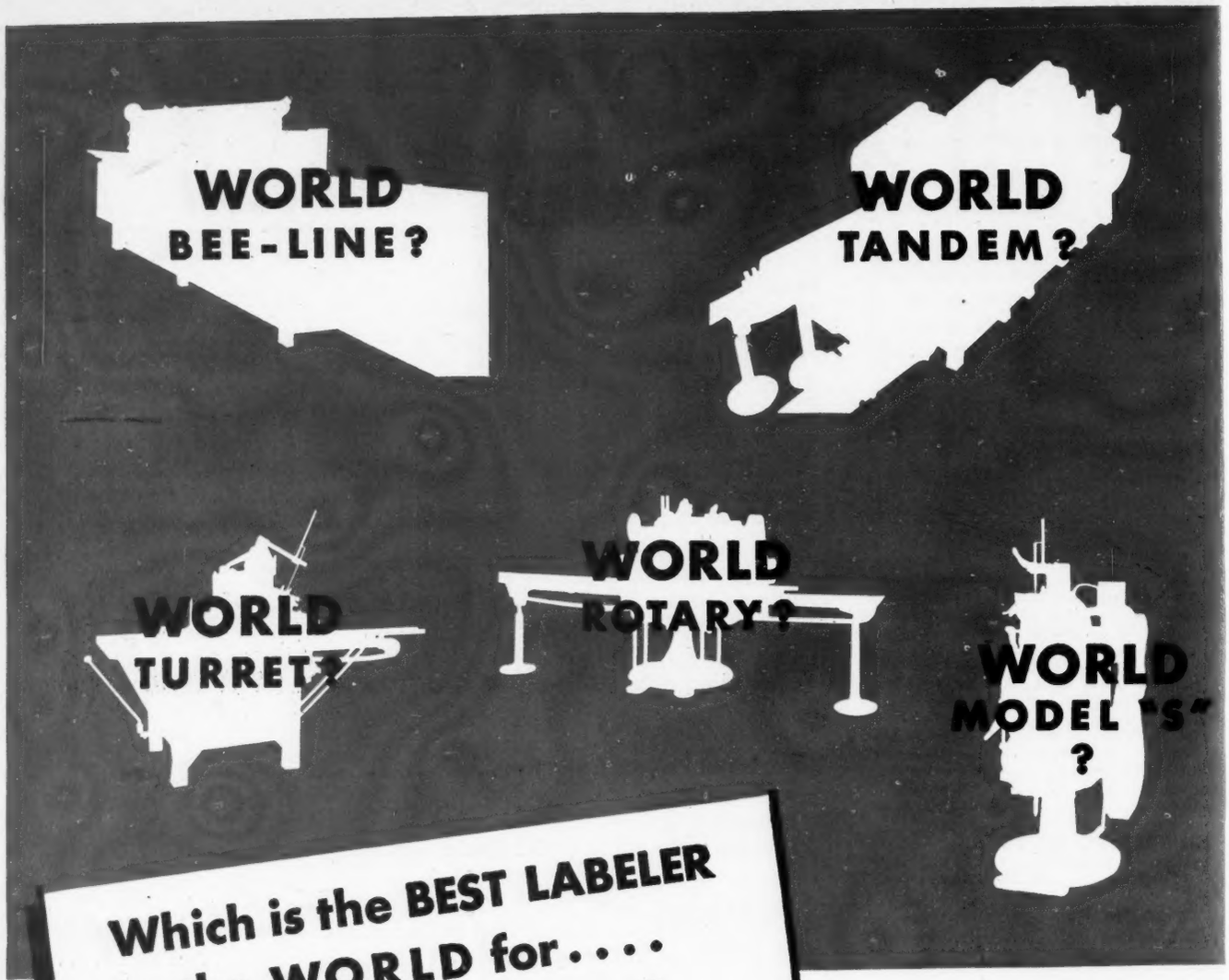

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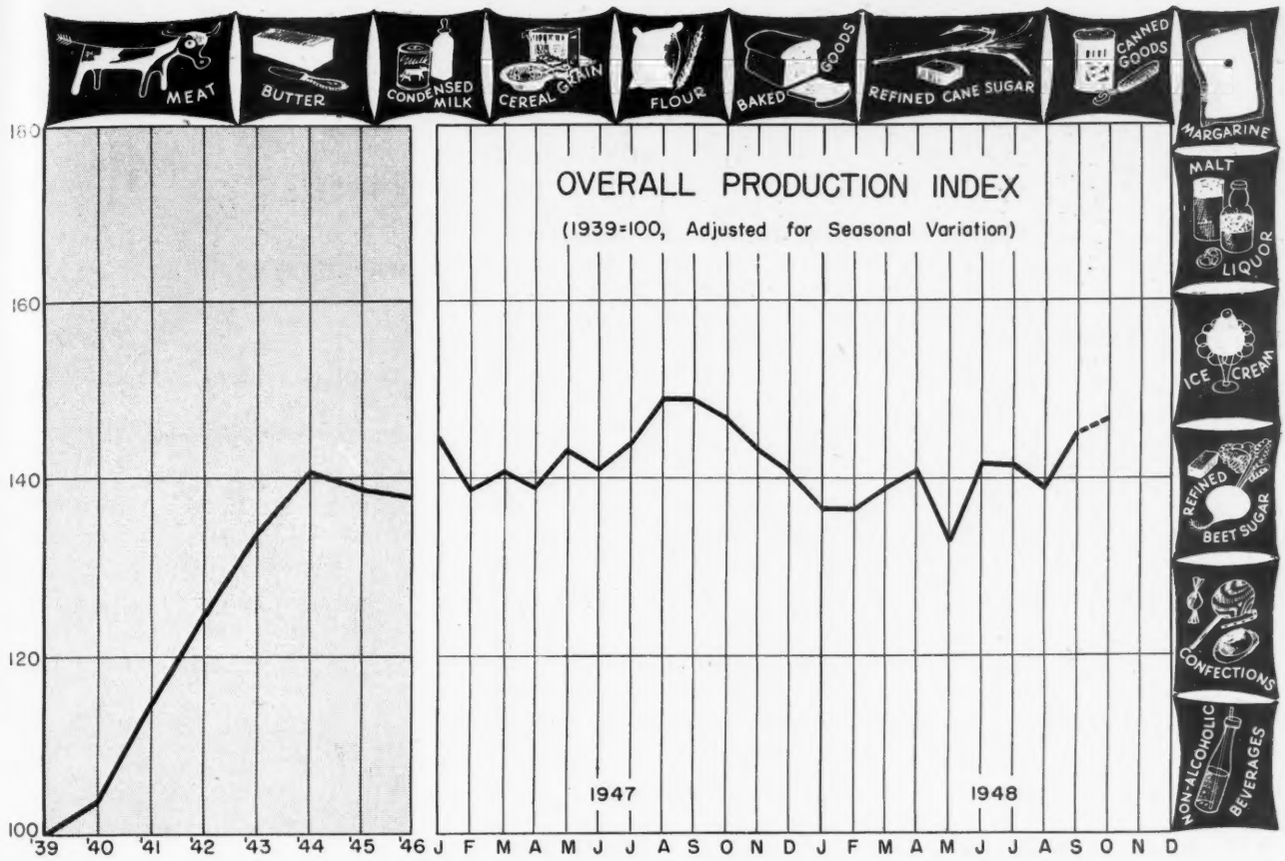


Food Industries Index

Overall production continues steady rise . . . Canning still below year ago despite month's increase . . . Condensed milk remains steady

FOR the month of October, FOOD INDUSTRIES' index rose to an estimated 147, which continues the upward trend indicated by the revised September figure of 145. In August the index stood at 139.

The October figure brings production close to the peak of 149, reached in the fall of 1947, when demand was sharply stimulated by exports and inventory building. Better harvests abroad and better balanced domestic stocks are expected to limit the upswing.

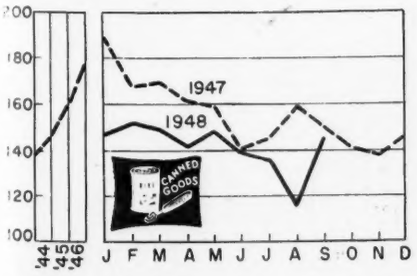
Canning activity continues below last year because of relatively small 1948 fruit and vegetable crops. Production of seven major vegetables for commercial processing this year is down to 4,500,000 tons, from 5,100,000 tons in 1947. Less fruit is available also, with the drop concentrated in deciduous fruits.

This does not necessarily mean that sales will be lower. The Department of Agriculture estimates that production plus stocks will allow domestic consumption of fruits and vegetables in 1949 to continue at recent levels. In the case of vegetables, supply and demand are approaching a balance. Inventories are now lower than a year ago, with no burdensome surpluses in evidence. So the 1948 packs of canned and frozen vegetables should be sold readily at prices about as high as prevailed in the past year. Packers and distributors will probably have no more than working stocks on hand when the 1949 packing season opens.

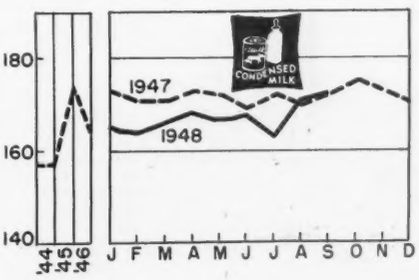
Some price concessions may be necessary during 1949 to maintain consumption of certain canned fruits. Although the pack is smaller, exports are also declining, and stocks are still quite large. If the 1949-50 fruit crop shows anticipated improvement over this year's crop, supplies may be large enough to cause price weakness.

Such a readjustment has already been made by producers of canned fruit juices. These juices have been selling in quantity at the lower prices now prevailing. Despite the record quantity packed in the current season, only a normal inventory is expected to be carried over when the new pack begins next fall. Therefore, the 1948-49 pack of fruit juices will probably be equally large.

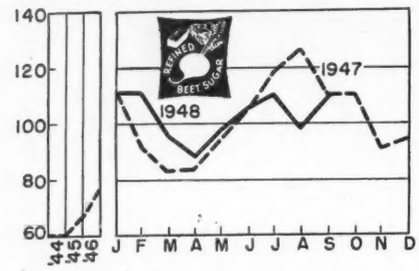
Canning Swings Back



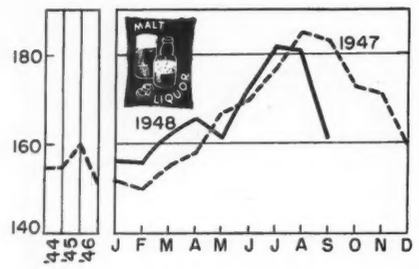
Condensed Milk Holds Gains



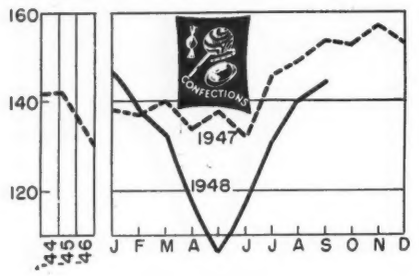
Beet Sugar Shows a Rise



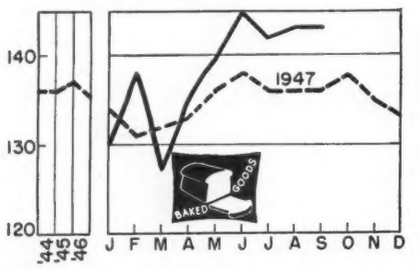
Malt Drinks Take a Tumble



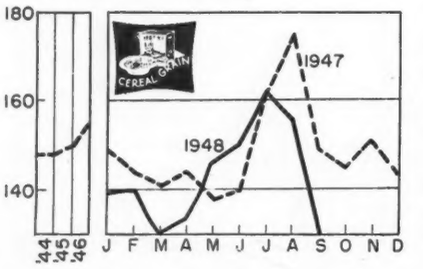
Confections Stay on Increase



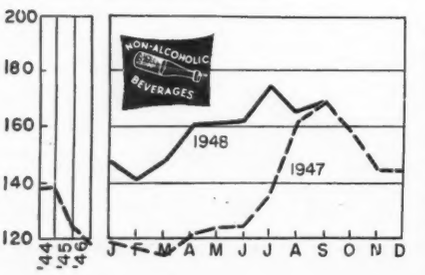
Baking Holds High Level



Cereals Continue Drop



Beverages Rise Slightly



Canned milk, being a basic food, follows a more stable consumption pattern than fruits or vegetables. Production has slumped, along with other manufactured dairy products, but continued heavy shipments for foreign relief provide a strong cushion.

Food supplies in general have increased seasonally during the fall months. This applies not only to manufactured foods, but also to fresh fruits and vegetables, of which a large crop has poured into wholesale markets. With less food diverted to export and inventory, supplies have been free enough to cause wholesale price declines. By early November, the BLS weekly index of wholesale food prices was off 7 percent from the top reached in mid-September.

The important thing to note about this price drop is that it is largely seasonal. Last year, wholesale food prices fell 4 percent in the same period. And not all of this season's drop is in processed foods. Fresh foods account for some of the decline. Despite newspaper headlines, featuring sharp price declines for particular foods, there has been little overall price weakness.

Key Foods

Meat and dairy output hold the key to the course of food prices over the winter. Livestock products make up nearly two-thirds of the value of food sold. Consumer demand for these products is still very strong, but increasing supplies could mean somewhat lower prices by spring. Last winter prices hit a peak in January, dropped until March, then began a new uptrend. In the coming months a slow but steady downtrend is more probable.

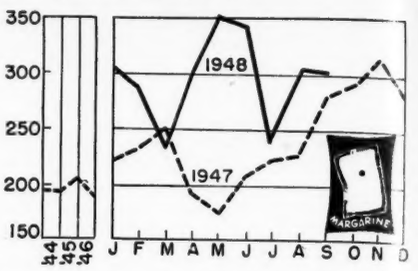
The extent to which food processors can pass along lower farm prices may be somewhat limited by rising labor costs. A fourth round of wage increases is by no means a dim prospect. General Motors, which set the 1948 wage pattern for industry, will have to come up with another boost of almost 6c under the terms of its contract. Other unions, encouraged by their recent political success, can be expected to make similar demands.

At a Glance—

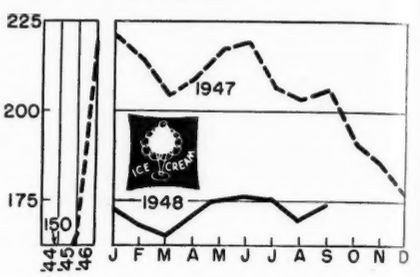
(1939=100 Adjusted for Seasonal Variations)

	Sept. 1948	Month Ago	Percent Change	Year Ago
Baking	143	143	..	136
Beverages	168	166	−2	169
Butter	57	63	−10	68
Canning	145	115	+26	150
Cereals	130	155	−16	136
Condensed Milk	172	171	+1	172
Confectionery	144	140	+3	154
Flour	130	138	−6	137
Ice Cream	174	167	+4	206
Malt Liquors	161	181	−11	183
Margarine	302	306	−1	281
Meat Packing	159	148	+7	160
Sugar, Beet	111	98	+13	111
Sugar, Cane	86	91	−5	109

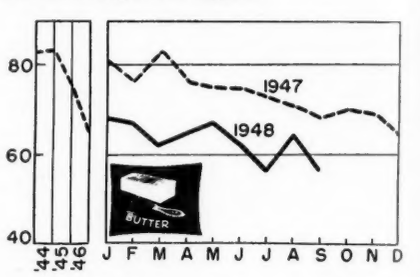
Margarine Slows Down



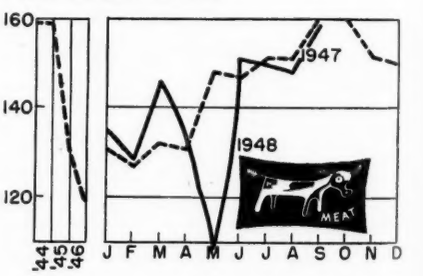
Ice Cream Turns Up



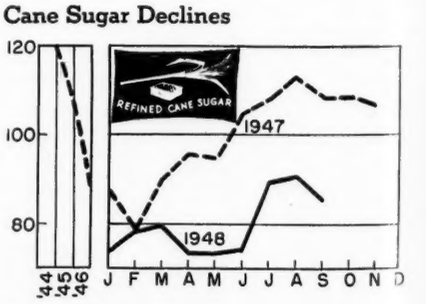
Butter Drops Off Again



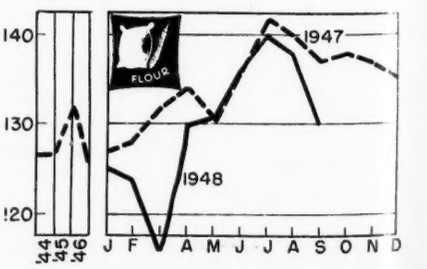
Meat Output Climbs



Cane Sugar Declines



Flour Output Falls Off



FOOD INDUSTRIES

DECEMBER, 1948

New Straws in Washington Wind

AFTER the dust of the election settled and the surprise factors were analyzed, it became obvious that some of them have a significance which the food industries cannot ignore.

Rural voters in the farm belt helped to put their states in, or close to, the Democratic column. So farm-block power is up, indeed, as apparently is the influence of labor interests.

If there ever was any hope that the new Congress would take a few more pegs out of the price-support program, it now has been dissipated. Southern Democrats are either chairman, or high on the seniority lists, of those committees which have much to do with smoothing the way—or blocking the way—of legislation. And the Southerners reflect very accurately the views of their constituents, who are firm believers in farm price supports and production controls.

In the committees of the last Congress, anti-cooperative tax legislation was much discussed. But such legislation will have virtually no chance at all in the incoming Congress. It seems that some farmers got the idea that the Republicans were against the cooperatives. Congressmen therefore will be wary.

In the wake of the Democratic sweep of both houses of Congress, there has been considerable speculation as to what might happen to the Capehart Committee's investigation of basing-point pricing. One thing seems certain: The Committee will hold its investigation as scheduled, at least until the first of the year.

However, if they choose to do so, the Democrats will be free to pigeonhole the Capehart report and start the whole investigation over again as a Democratic rather than a Republican show.

Another real possibility stems from the fact that the new chairman of the Congressional Joint Committee on the Economic Report, now headed by Senator Taft, will be Senator O'Mahoney. A longtime anti-monopoly man, O'Mahoney might exert his influence to have the basing point question handled as a part of a general investigation of monopoly.

It seems likely that the present Secretary of Agriculture, Charles F. Brannan, will continue in his post. The Secretary realizes that new markets abroad may have to be found for the growing surplus from American farms. He also strongly favors soil conservation, not only as an "obligation to posterity" but because it increases soil productivity.

All in all, the results of the election seem to reveal an undercurrent of sentiment for government along New Deal lines to meet the problem of inflation and the high cost of living. Certainly the President, toward the end of his campaign, pledged himself more solidly to the New Deal side of a greater number of issues than did Roosevelt. A commitment of particular interest to the food industry is that to control prices.

Bolstering the New Deal trend is the fact that among the few hard workers for the President's election, New Dealers were most prominent. Also supporting this is the fact that organized labor will get a large share of the credit for putting the Democrats back into power. And this points to revision, if not repeal, of the Taft-Hartley Law.

In short, it looks as if the country—and the food industry—will be under a government whose actions will be strongly influenced by New Deal thinking and will favor labor and farmers. Business men need not look for special favors. They should, therefore, publicize their contributions to the welfare of labor, farmers and consumers in general. This is something which they have not done to date with particular effectiveness.

PS—Chances are that the margarine taxes will be repealed. But butter manufacturers will fight to outlaw colored "oleo" entirely.

F K Lawler

EXECUTIVE EDITOR

The Talk of the Industry

• HIGH freight rates—assisted by the shift to f.o.b. pricing—is bringing about some relocations in the food processing field. With about 30 percent of the Eastern wholesale list price of California canned fruits and vegetables going for transportation, some California packers are building or buying plants in the East. Hunt Foods, Inc. for instance, has purchased Harbauer Co., Toledo, Ohio, and E. Pritchard, Inc., Bridgeton, N. J. California Packing has taken over Edgar Hurff Co.

To the FTC, such acquisitions no doubt come under the heading of monopolistic empire building.

• KNOWN for their rugged individualism, farmers sometimes don't do what the experts expect. As a current case in point, midwestern cattle feeders have not filled their lots with beef to be fattened on the lower priced corn. The reason: The farmers know what the parity price will be for their corn; but they don't know what they would get for the highpriced feeders into which they put their corn.

A similar cautious attitude has been expressed by some farmers in respect to raising more hogs.

Some think—and a midwestern bank so advises farmers—that January and February will be a better time to buy feeder cattle.

This means less quality beef next spring and summer, possibly less pork than had been expected—sad news for meat packers and consumers alike.

• OUT of the papers and forums at the latest Packaging Institute meeting came much of value to food processors. But there probably was nothing more surprising to designers of food packages than one finding reported from a survey which determined reactions of a panel of 10,000 consumers. It is that 92 percent of the consumers still open with a knife the packages which are provided with top closures. To get homemakers to open packages the right way, it apparently will be necessary to dream up a container that will bleed when cut by a knife.

• THE Federal Trade Commission's attitude toward base-point pricing is becoming widely recognized as a factor which throws the country's efficient mass-marketing operations out of gear. This means, in turn, that it acts against mass production and the low-cost benefits which result from it. There is reason to hope that new legislation will be passed to correct the damage done by FTC. And every business man would do well to use his influence in that direction.

• FLIES apparently are developing resistance to DDT. This is indicated by tests made by argicultural and public health entomologists in various parts of the country and reported to the Bureau of Entomology and Plant Quarantine. The federal entomologists also made tests in the vicinity of Orlando, Fla., where the potent insecticide was used around dairies as early as 1943.

The tests show that there are strains of housefly which now require longer contact with DDT for the kill.

Many health authorities have questioned the use of DDT in food plants where it might contaminate the product. Now even more attention will be paid to other new insecticides which are potent but not toxic.

• OUT of the dairy conference at Atlantic City came a bit of business philosophy which should be mulled over in the minds of management in all branches of the food industry. The ice cream manufacturers were told that their big competition comes from the manufacturers of other foods. So their goal should be to turn out a product which will be bought by consumers in preference to pastries and other desserts, not merely one which is as good as other brands of ice cream in the same market. Ice cream dealers need to be educated to this fact of business life, too, since they have been inclined to put prices higher than necessary.

• DENTISTS are funny people. They always are blaming food for their good fortune in having a lot of tooth-repair business. Their latest complaint is against those who like to eat several times a day. The person who eats only twice a day is said to be a better dental risk than the one who partakes of nutriment more often. Could be, but how about the life insurance risk?

• FROM wool wastes, Botany Mills has produced a new protein product, called Botanein P. If this were to be added to foods, the discoverers think, it might promote the growth of epithelial tissue such as skin and hair. Should this turn out to be true, the result may well be a new crop of business men with thicker skins and more hair.

Hors d'Oeuvres

• In predicting that 10 billion doughnuts will be consumed in 1948, American Bakers Association gets to wondering how the holes got started. A 10-billion-hole gift horse and they have to look it in the mouth!

• *National Fisheries Institute is sponsoring a series of matchbooks, which will describe America's most famous fish. Each series will also carry a "detailed" recipe for cooking the species described. Apparently, any left over space is just going to be left blank.*

• The staid old U. S. Chamber of Commerce is trying to muscle in on our act. Its "Business Action" for September 3 says: "One industry which exists only by virtue of inflation is bubblegum." Gentlemen, one of us must go.

• *And then there is the College Inn Food Products Co. working up a campaign on canned schmoo, the Li'l Abner comic strip product. Time was when OPA bulletins were our only worry.*

• A federal judge in California ordered 124,000 gal. of beer sent down the drain because, he said, it would cost too much to bottle it while the plant was undergoing receivership-reorganization. Naturally, the bottling equipment wouldn't be at its best at such a time.

• *Now that the subject has been brought up, a Japanese woman has been reported as living exclusively on beer for more than 20 years. The government allows her a special ration of 3 qt. daily. And not long ago they were telling us the Japs were hardly civilized.*

• U. S. Rubber is using dextrose and three other chemicals to speed up the processing of synthetic rubber. Makes better tires, too, they say. So, if f.o.b. pricing gets too tough, the corn refiners can just move to Akron.

• *At a government advisory committee lunch a while back, candy was served containing 2 percent yeast and 1 percent bone meal. This was an example of fortified candies "superior in food value to ordinary candy." So now its going to be good for you. No more eating the stuff just because you like it.*

• Its hard to believe, but that grand old time is here again—to wish you all a very merry Christmas. J.A.J.J.

Control of Quality and Cost Begins In the Field

First of Two Revealing Articles on the Hawaiian Pineapple Co.

Photos by Hapco

From 65 acres producing 2000 cases to 26,000 acres producing 20,000,000 cases annually, is the record of growth of world's largest pineapple canner.

By C. R. HAVIGHORST
Associate Editor
"Food Industries"

AGRICULTURAL research and engineering, as well as good marketing practices, are responsible for the growth of the giant Hawaiian Pineapple Co., Ltd., operator of the largest fruit cannery in the world. The company grows and processes roughly 80 percent of the nation's canned pineapple supply.

The growing consumer demand for this fruit has been satisfied by the acquisition and development of new pineapple land, and by significantly increasing the yield of fruit per acre by the use of advanced agricultural methods. Since the beginning of the industry's history, the average plant population has grown many fold. In some areas, it has now reached 17,500 plants per acre. Advances in preparation of the soil, plant genetics and selection, planting, cultivation, insect control, and harvesting have gone hand in hand to make this possible.

In 1901, enterprising young James D. Dole—whose name has since become almost synonymous with pineapple—and a few friends and associates formed the Hawaiian Pineapple Co., Ltd., packer of Dole pineapple products. Its capital was $20,000, and its original plantings were made on a "plantation" of about 65 acres. In 1903, the Dole cannery produced its first pack—less than 2,000 cases.

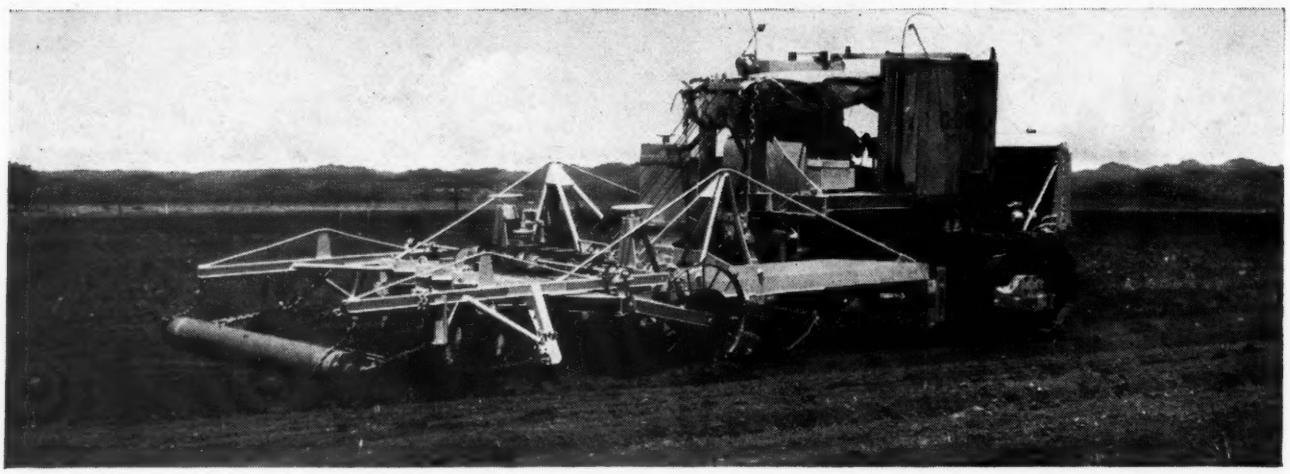
Today, the company's Honolulu plant, the largest fruit cannery in the world, can equal its first year's production in about twelve minutes. On the islands of Oahu, Kauai, Lanai and Maui a total of nine companies, of which Dole is the largest, now grow and process over 20,000,000 cases, valued at approximately $70,000,000 a year. The industry has become second only to sugar in the Islands' economy.

One of the striking features of the giant Hawaiian Pineapple Co. is the integrated nature of its varied operations. From planting and harvesting of its 26,000 acres of pineapple, through processing in its huge cannery and nation-wide distribution, company executives control and watch over the product. In no one of these operations can a major development or problem arise that is not immediately communicated in the other activities of the company. No department can get too far ahead or fall too far behind the capacities of another.

Since the first pack was marketed in 1903, growing demand for pineapple has presented an almost continual prob-

SOIL PREPARATION . . . Included Is Highly-Effective D-D Treatment

HARROW, drawn by tractor, cuts up the half-buried "trash" (field name for old plants), kills weeds, and also makes the already plowed soil more friable. Trash has been previously shredded, mixed with the soil, and allowed plenty of time to decompose.



MACHINE re-plows field just prior to planting, and simultaneously the fumigant (D-D) is injected into the soil. The fumigant injection arms are fitted just forward of drag roller (left). Only one man is needed to drive tractor and regulate application of the D-D.

lem of getting increased production from the plantations.

After expanding its plantings on Oahu from the original 65 acres to approximately 12,000 acres, the company, in 1923, purchased the entire island of Lanai. Today, 14,800 acres of pineapple fields, a city of 3,500 people, a man-made harbor, an airfield, a hospital and school are monuments to the company's stewardship of this once barren island. Land which is unsuitable for pineapple cultivation or for buildings is used by the company-owned ranch. In 25 years, the pineapple industry has transformed 90,000 acres of waste-land on Lanai into an important economic unit supporting a thriving, modern community. The development of new land is closely tied in with the problem of increasing the overall yield per acre.

Agricultural Research

Interwoven with every chapter of this story is the work of the company's agricultural scientists and the industry-supported Pineapple Research Institute. From its earliest days, the company has devoted a sizable part of its annual budget for argicultural research. Today, well-staffed departments of horticulture, genetics and plant physiology are equipped with the most modern laboratory equipment and field facilities, both in Honolulu and on each plantation. Developments in agricultural engineering, under the plantation engineering section, have been indispensable, not only in cutting costs of routine farming operations but also in applying on a commercial scale the knowledge gained by continuous research.

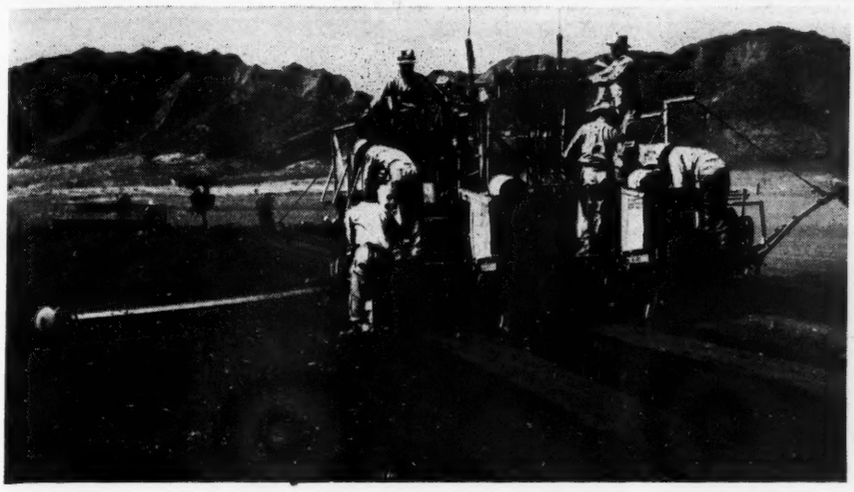
In addition to maintaining its own extensive research and development program, the company has been the largest contributor to the Pineapple Research Institute. Now located at the University of Hawaii in Honolulu, this cooperative organization dates back to 1914, when the island companies first appropriated money for the solution of common agricultural problems. Eight specialized departments—agricultural engineering, entomology, chemistry, genetics, soils, pathology, meteorology and physiology—are engaged in basic agricultural research and its application to pineapple growing. PRI has played a vital part in the growth of the Islands' second industry.

The climate of Hawaii is well-suited to the pineapple, but the soil needs special care and nourishment. Soil preparation begins six to eight months before planting. Tractor-drawn plows, equipped with eight disks, turn over the soil to a depth of about 8 in. The old plants, or vegetative "trash", are shredded, mixed with the soil, and allowed slowly to decompose.

After the plows, come the multiple-disk harrows, cutting up the half buried trash and killing weeds. Plowing and harrowing may be repeated several times in the interval before planting; meanwhile the soft broken earth soaks up and stores the rainfall.

Occasionally, in fields where drainage is a problem, sub-soiling is practiced. Here the earth is broken to a depth of 18 or 20 in. Where this operation is necessary, it is customarily followed by plowing and dragging the surface to smooth it for the operations that follow.

PLANTING . . . Mulch-Paper Job Is First, Then Pineapple Slips Go In



THREE-ROW machine laying protective mulch paper. If needed, D-D may be applied under paper as it is laid. Extended arm (left) marks a guideline for next three rows.

IN PLANTING, worker punches hole in paper, and then inserts the pineapple slip.

Simultaneously with the last plowing, the soil is fumigated. Next to each of the eight plow disks are jets which force D-D (1.3 dichloropropene, 1.2 dichloropropane) into the soil in a regular pattern.

Dr. Walter Carter of Pineapple Research Institute discovered the value of D-D as a soil fumigant. Previously, chloropicrin—a tear gas—was used. Not only was it unpleasant and difficult to handle, but its high volatility required an earth seal of watered soil to retain it. Though also toxic, D-D is not only economical and easy to handle but, being a by-product of the manufacture of plastics, it is cheaply produced.

The results of the use of D-D are already startling. Acres which had reached a degree of infestation that prohibited planting are returning to cultivation. Infestation is being reduced in fields that had not yet crossed the margin separating the healthy land from that with a "pathological complex".

The most destructive of the soil organisms—the nematode, a microscopic eel-like worm that destroys the ability of roots to nourish the plant—is now under control. Harmful bacteria and some destructive fungi also succumb to the new fumigant. Except in heavily infested areas, one application of D-D may keep a field clear for years. Dr. Carter believes that D-D may make possible the economic rehabilitation of over 2,000,000 acres of barren land in the South alone.

To protect the soil it has so carefully nurtured, the company is bringing to completion what is said to be the largest soil conservation program ever attempted by private industry. Since 1937 on Lanai and 1939 on Oahu, installation of 1,200 miles of terraces and construction of accessory diversion ditches and dams have cost $350,000.

On Lanai, extensive plantings of trees and grass reduce erosion on barren lands adjacent to the pineapple fields, and an annual photographic record of the island provides a measure of changing contours. The entire conservation program in the fields themselves requires closest coordination with the simultaneous development of mechanized farming equipment.

The Inter-Cycle Log

Before a crop is planted, the company starts gathering data on the soil characteristics that may influence future plant growth. During the period of soil preparation, an "inter-cycle log" on each field is scrupulously maintained. The amount of vegetative trash knocked down is recorded. Its rate of decomposition, which varies with soil temperature and moisture, is periodically determined. Moisture is measured by weighing soil samples before and after drying. The extent of trash decomposition is a large factor in determining planting time.

AUTHOR C. R. "HAVIE" HAVIGHORST, FI's Western editor, watches mechanics at work on his plane while waiting for takeoff for Hawaii to get this story and see other food processing developments in Islands.

Planting

Planting pineapple, a fruit which requires 20 months to mature, is a unique agricultural operation. Having few or no seeds, the plants must be vegetatively propagated. Slips, which grow from the stem of the plant just below the fruit, are gathered from harvested fields, cured in the sun, and then used for planting material.

Before the slips are planted, special machines lay miles of "mulch" paper in rows across the fields. This paper, similar in appearance to roofing paper, not only helps prevent weed growth, but also conserves moisture and fertilizer in the soil, and raises soil temperature. The machine laying the paper covers the edges with earth to fix it in place. Staggered marks near each side of the paper indicate where the planter will insert the slips.

Planting remains the only major field operation which has not been mechanized. Today, slips harvested from another field are scattered along the rows of newly laid mulch paper. A plantation worker, using a narrow steel trowel, first punches a hole through the mark in the mulch paper, then with his other hand he deftly inserts a slip through the hole and into the soil beneath. An average planter, working in this manner, can set out about 7,000 slips in an 8-hr. day.

Although mulch paper, first used in pineapple growing by this company (in 1920) increased yields 15 to 25 percent, recent developments indicate the possibility of using plant material as a substitute.

The severe shortage of both paper

CULTIVATING . . . Weeds and Bugs Are Killed, Fertilizer Applied

COUNTLESS HOURS of back-breaking labor are saved by this specially fitted wheel-tractor. Jets at sides spray weed killer at bases of the pineapple plants. Cultivators, attached to back of tractor, uproot weeds that have grown between plant rows.

IRON SULPHATE must be applied directly to the leaves, rather than to bases of the pineapple plants, as with the other fertilizers. One truck driver and one spray-unit operator comprise crew for this job. Here, spray arm is being swung over.

BATTLING the mealy bug. Spraying of Diesel oil solution over outside rows of fields has been found very effective in keeping destructive mealy bugs away from plants. A broad barrier is laid down by this 50-ft boom. The oil has no ill effect on pineapples.

and labor during the war combined to make weed control a major problem. The answer came unexpectedly from the vegetative trash, which according to accepted practice had been mixed with the soil in plowing. It was found that the trash, if allowed to remain on the surface, not only inhibited weed growth effectively, but also preserved soil moisture more efficiently than did mulch paper. Experiments indicated that surface trash, decomposing more slowly than plowed-in trash, furnished soil nutrients over a longer period.

Vegetative surface trash is not the equal of mulch paper, however, in raising soil temperature. In the cool, upland fields, therefore, it is not an acceptable substitute. At present writing, both methods are used extensively.

Plants, like human beings, have personal characteristics. Planting material must be selected from healthy stock. Some of the plant traits are known to be caused by soil conditions, insects, and other factors which are, in varying degree, controllable. Some traits are clearly hereditary. These are the special problem of the company's geneticists, who by plant breeding are continually striving to find a variety that is hardier, more easily processed and even more desirable from the consumer standpoint than the Smooth Cayenne.

Still other traits—such as the shape of the fruit, which has an important effect on cannery extraction—may or may not be hereditary. The solution to many of these problems must await the interpretation of reliable and complete data accumulated over many plant cycles.

When the slips are planted, the most precise horticultural evaluation of plant nutrition and growth ever attempted for a commercial crop begins in Hawaiian's fields. The record of this evaluation is called the "crop log". At frequent intervals throughout the life of the crop, the following tests are made and recorded in this log:

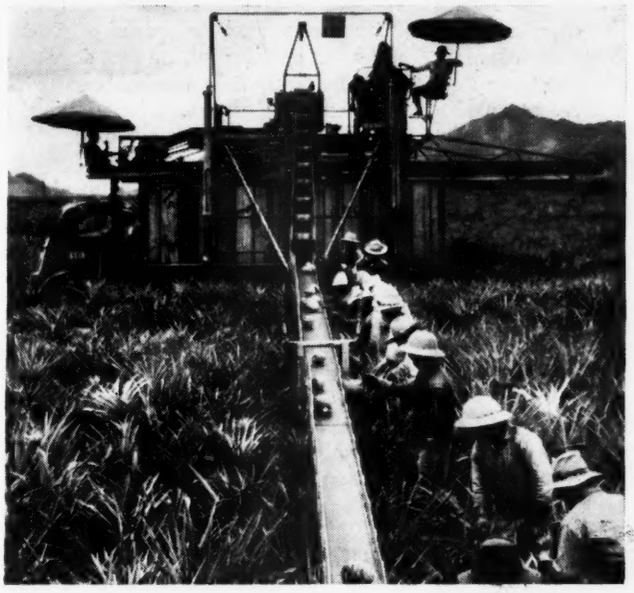
1. A visual test of the leaves—indicates iron or zinc deficiency in the plant. A deficiency in the plant's supply of these minerals results in clearly discernible leaf symptoms.

2. A visual inspection of a leaf cross-section—reveals the internal plant water-status.

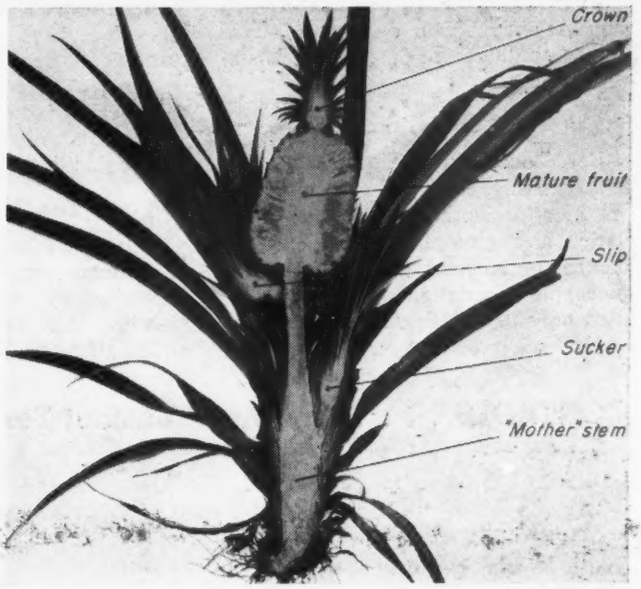
3. Leaf color readings provide an estimate of reserve carbohydrates. This information is particularly important in determining the amount of future nitrogen and other fertilizer applications. The plant's carbohydrate supply will ultimately combine with nitrogen in its growth process. Ammonium sulphate fertilizer, providing the nitrogen, is wasted if the plants are deficient in carbohydrates.

HARVESTING . . . Fruit Is Gathered Ingeniously; "Straddlers" Speed Loads

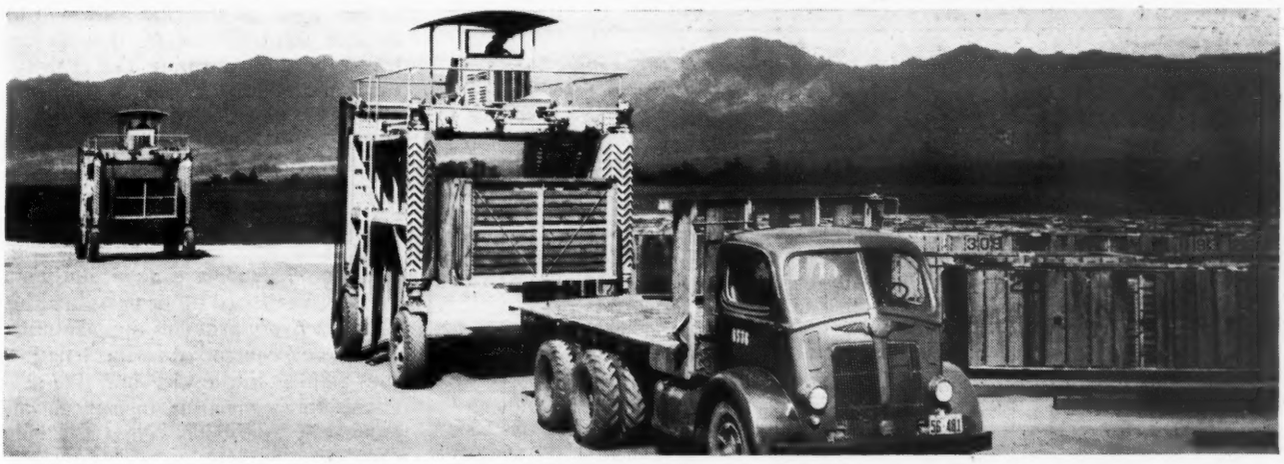
FULL OF FRUIT. 7-ton truck-mounted bin (left) rolls out, and now empty bin (right) will be driven under hydraulic-jack-supported harvester. When new bin is in place, harvester will be lowered onto it, and then boom will be brought down into picking position.



PICKERS move along close behind the 50-ft. conveyor-belt boom which quickly whisks the pineapples into bin. Truck moves harvester along road at a rate in pace with the picking. Full bins go to the transfer station (see below).



PLANT ready for first harvest is seen here in cross section. Mature fruit grows directly from "mother" stem. In about a year, sucker will bear another, smaller fruit—the "first ratoon" crop. Slip will be employed as planting material.



STRADDLE TRUCKS at Oahu plantation transfer station remove loaded bins from field trucks, then place them on 20-ton semi-trailers, each of which carries two bins to Honolulu cannery. Empty bins are also "straddled" onto trucks going back to fields for new loads.

4. Chemical analysis of white basal leaf tissue—determines quantitatively the presence of calcium, potassium, nitrate, magnesium and phosphate. The results indicate the kind and amount of fertilizer needed. When indicated by leaf analysis, potassium suphate is added to provide potash, and super phosphate, to provide phosphorus. Still in the experimental stage is the use of lime to furnish calcium, and the use of magnesium sulphate to furnish magnesium.

5. Measurement of plant growth, by selecting, uprooting and weighing four sample plants, one to represent each of the four sizes (large, medium, small and very small). It is then simply a matter of counting 100 plants at random and classifying them, according to these sizes, to determine the average plant weight in the fields. This plant-size estimate is useful in computing fruit estimates and expected time of fruiting. At the same time, a leaf count is also made; moreover, the number, average length and average width of the leaves are recorded.

6. Description of the root system. Data

includes root anchorage in foot-pounds; the number, length, depth, and radial extension of the roots; and the number of white root hairs, through which the plant absorbs nutrients. Also recorded are the number of root "galls", indicative of nematode activity in the soil. Also the presence of "shiny" roots—proof that a harmful grub is attacking the plant.

7. An estimate of average sunlight exposure per plant.

8. Records (as in the inter-cycle log) of soil moisture, both at 6 and 12 in. depths.

Supplementing the crop log, 25 company-maintained weather stations in the cultivated area of Lanai alone, and 19 on the Oahu plantations, continuously record rainfall, temperature and sunlight intensity in their areas. Humidity readings are taken at each station weekly.

Weeding

For about 20 months, from planting to harvesting, the fields are cultivated. As in all scientific agriculture, cultivation means weeding, fertilizing and control of harmful organisms on the pineapple plantations. Irrigation is used only in small areas on Lanai.

Use of mulch paper and surface trash has greatly reduced the weeding problem. Weeds growing between the rows of mulch are removed by mechanical cultivators and weed sprays. Only on a very few fields inaccessible to mechanized equipment is hand hoeing still practiced.

Fertilization

The commercial fertilizers mentioned above supply the nitrogen, potassium and phosphorous requirements of the soil. They are applied mechanically near the bases of the plants. However, iron in solution, is sprayed directly on the leaves. Large amounts of manganese in the lowland soil tie up the iron in combination and keep this necessary nutriment from the plants. Hence, the addition of more iron to the soil could serve no purpose, and accordingly another means of adding this mineral to the plant's diet was required.

The Mealy Bug

Although many harmful organisms, most important being nematodes, are controlled by soil fumigation before planting, there are other enemies that attack pineapple above ground. These must be controlled during the cultivation period. Most dangerous has been the mealybug, which causes "pineapple-wilt".

Mealybugs are to ants what cows are to human beings. The ants carry them from one pineapple field to another. In return, the mealybugs secrete a sticky substance on which the ants feed. When their "milking days" are over, the ants butcher and eat the bugs.

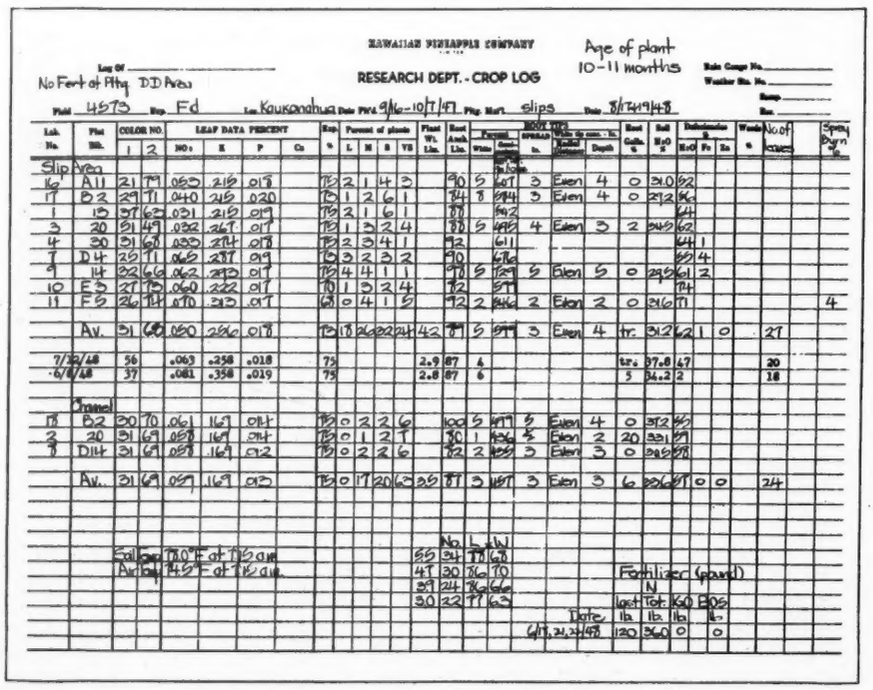
Dr. Carter discovered that, while feeding on pineapple leaves, the mealybugs inject a toxin into the plant which damages, and may eventually kill, the entire root system. Once this information was available, it was a fairly easy matter to control the spread of pineapple-wilt. An oil emulsion was developed that destroys the mealy bugs when sprayed on them; and in addition, if sprayed on the outer rows of a field, it prevents their entry.

Sporadic outbreaks of the mealy-bug may still occur where they have been brought into a field on farm equipment or perhaps by birds or other natural agents. But as soon as their presence is detected, the area is sprayed. Hence, "pineapple-wilt" is now almost entirely a thing of the past.

A constant vigil against any enemy which might attack the pineapple is maintained throughout the entire cultivation period.

CONTROLS . . . There Are Constant Tests and Checks

IN COMPARATIVE operation, both of these pineapple fields were planted at the same time and given the same cultivation. But field on left did not get D-D prior to planting, while field on right did—eloquently testifying to effectiveness of the fumigant.



HAWAIIAN PINEAPPLE COMPANY
RESEARCH DEPT. - CROP LOG

Age of plant 10–11 months

No Fert or Pltg D-D Area

Field 4575 Rep. Ed Loc. Kaukonahua Date Pltd. 9/16–10/7/47 Pltg Mat. slips Date 8/14–19/48

Lab. No.	Plot Rep.	COLOR NO. 1	COLOR NO. 2	LEAF DATA PERCENT NO₃	LEAF DATA PERCENT K	LEAF DATA PERCENT P	LEAF DATA PERCENT Ca	Exp. %	Percent of plants L	M	S	YS	Plant Wt. Lbs.	Root Anch. Lbs.	Percent White	Percent Color	ROOT TIPS Width (in mm.) Lbs.	ROOT TIPS Depth	ROOT SPREAD	Root Galls %	Soil H₂O %	Deficiencies H₂O	Fe	Zn	Weeds %	No. of cases	Spray Burn %
Slip Area																											
16	A11	21	71	.063	.218	.018		75	2	1	4	3		90	5	67	3	Even	4	0	31.0	62					
17	B3	29	71	.040	.216	.020		75	1	2	6	1		74	3	84	3	Even	4	0	27.2	56					
1	15	27	62	.031	.218	.019		75	2	1	6	1		77		82						44					
3	20	21	49	.032	.267	.017		75	1	2	2	4		70	5	48	4	Even	5	2	24.5	62					
4	30	21	60	.030	.214	.018		75	2	3	4	1		92		61						44	1				
7	D4	29	71	.062	.237	.019		70	2	2	2	2		90		66						69	4				
9	14	22	66	.062	.213	.017		75	4	4	1	1		70	5	69	5	Even	5	0	29.5	61	2				
10	E5	27	75	.060	.222	.017		70	1	5	2	4		82		57						74					
11	E9	26	74	.070	.213	.017		60	0	4	1	5		92	2	46	2	Even	2	0	21.6	71					4
	Av.	51	68	.050	.226	.018		73	18	26	22	24	42	81	5	64	3	Even	4	tr.	31.2	62	1	0		27	
7/22/48		56		.063	.258	.018		75					2.9	87	4					tr.	37.8	47				20	
6/4/48		37		.081	.358	.019		75					2.8	87	6					5	34.2	2				18	
	Channel																										
18	B2	30	70	.061	.169	.014		75	0	2	2	6		100	5	87	5	Even	4	0	31.2	63					
2	20	21	69	.058	.169	.014		75	0	1	2	7		80	1	86	5	Even	2	20	33.1	67					
8	D14	21	69	.059	.169	.012		75	0	2	2	6		82	2	88	3	Even	3	0	29.5	58					
	Av.	21	69	.059	.169	.013		75	0	17	20	63	35	87	3	87	3	Even	3	6	29.6	61	0	0		24	

Fall Low 70°F at 7:15 a.m.
Air Low 49.5°F at 7:15 a.m.

No.	L x W
55	24
41	30
29	24
30	22

Fertilizer (pound)

Date	N last lb.	N Tot. lb.	K2O lb.	P2O5 lb.
6/17, 21, 24/48	120	240	0	0

CROP LOG, maintained for each field, records pertinent data about leaves, measurements of plants, root-system information, sunlight estimates, and amount of soil moisture.

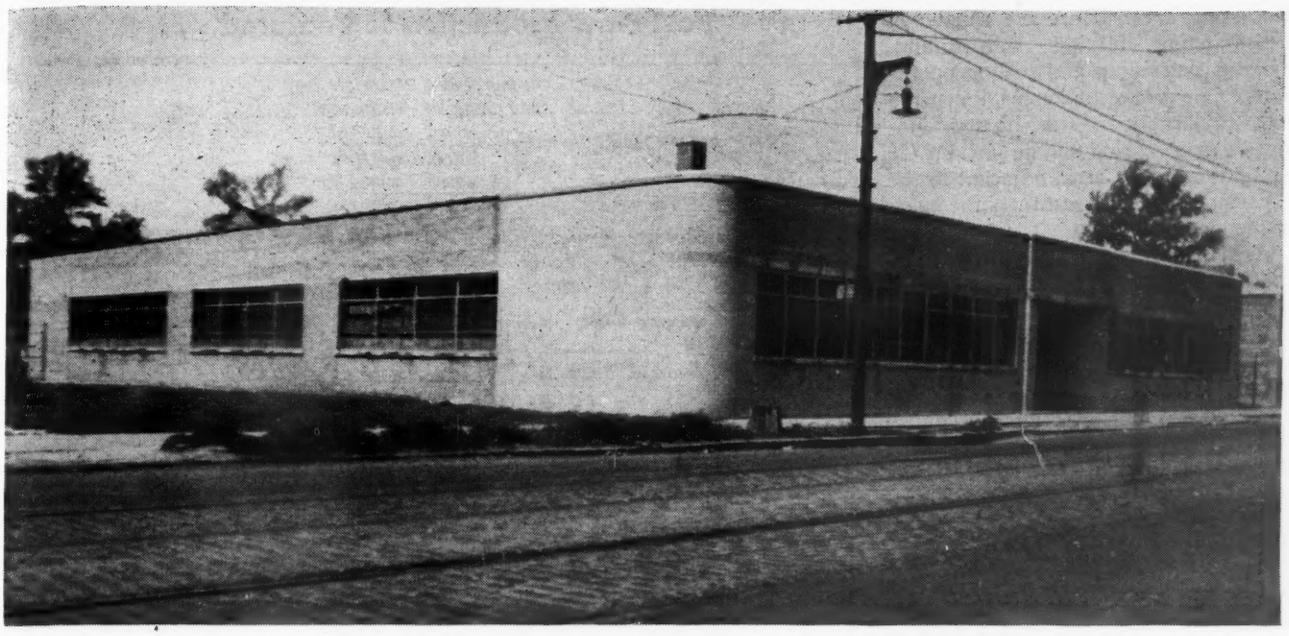
Control by Hormones

After months of cultivation, a "red bud" appears in the center of the plant —the first visible sign of fruiting. About the size of a walnut, this miniature pineapple contains approximately 150 individual flowers—a number equal to the "eyes" of the ripe fruit. On top of this solid cluster of flowers new leaves develop, forming the crown of the pineapple fruit. The bud appears about 15 months after planting and each flower on it blooms for only a day. The fleshy part of the bud continually enlarges and will eventually form the edible portion of the mature fruit.

Certain hormones can, within limitations, either speed up or delay fruiting. This discovery provides the plantations with some control over the length of the plant's life cycle, and hence it allows some variation in planting and harvesting periods. This flexibility also has considerable significance in canning and marketing operations.

About five months after flowering, the single fruit on each plant reaches maturity. It weighs about 5 lb. Twenty months have elapsed since the slip was planted. On each mature plant, now 3 or 4 ft. high, several suckers have developed on the main stem. Approximately a year after the single fruit of the first crop is harvested, each of the

(*Continued on page 210*)



MODERN, one-story meat canning plant provides an efficient operating facility where good lighting and ventilation are accented.

Output Trebled, Costs Cut In Canned Meatball Operation

In new plant, continuity of flow, plus new speed with automatic and semi-automatic units, offset increased overhead and high cost of materials

By F. C. AINSLEY, Secretary-Treasurer, Nu-Trishus Products Corp., Chicago

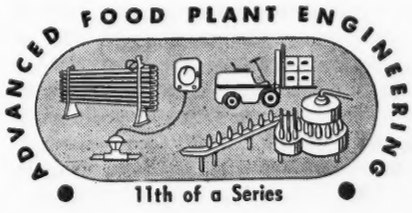
AN INCREASE of over 300 percent in the production rate—with a decrease of 25 percent in labor—is the achievement of Nu-Trishus Products Co., Chicago. This was accomplished through a sound program for combatting increasing costs without lowering the quality of the product and without excessively raising selling price. Further advantage is the ability to more than double the new production rate without doubling factory personnel.

Shifting of production operations from the improvised prewar plant to a new, more permanent, and engineered plant is part of the explanation for increased production. Other factors are: (1) Concentration on a single, standardized product in a standardized pack; (2) mechanization of operations with improved automatic and semi-automatic equipment; and (3) laying out and equipping a production line to obtain flexibility in production rate to meet fluctuating market and seasonal demands.

The plant structure consists of a 100 x 100 ft. one-story daylight building of brick, glass and steel construction with overhead fluorescent lighting. The plant is divided into five areas—three for production, one for office work, and one for plant service or utility.

Layout of Plant

The plant layout conforms with recommended practice of putting office and plant services in fixed areas where they will not hinder expansion of production areas, yet where they will be adjacent and convenient to those areas (Parker and Stateler, p. 610, May 1947 FOOD INDUSTRIES). Also, the arrangement of the production areas permits the flow of: (1) Materials and supplies into the plant, (2) materials-in-process through the processing areas, and (3) finished and cased products to the shipping dock or to storage without crossing the production line or backtracking.



Beginning with incoming supplies and materials, Area No. 1 (29x30 ft.) extends from receiving and shipping dock to Area No. 2. The latter is 50x71 ft. It houses the incoming supplies and materials, storage for ingredient materials and finished product stock, and empty cans that are fed to the central processing area. It is to be noted that Area No. 1 also accommodates operations incidental to handling and stenciling of outgoing shipments.

These first two areas constitute the lengthwise portion of the plant (115 ft. including shipping dock). This is on the side adjacent to open-property. Street and alleys are barriers to expansion on the other three sides (see plant floor plan).

Area No. 3 is a 47 x 50 ft. central

processing area. Here are conducted the grinding, mixing, ball-forming, cooking, can-filling and sealing operations. One side of its longer dimension consists largely of steel-framed windows with swinging middle sections for ventilation. This area, adjacent to the expansion barrier, constitutes the heart of the plant.

Area No. 4, 29x70 ft., extends across the rear end of the plant and is divided into two sections. One section is, in fact, a 20x29-ft. room (nearest to the side alley barrier) housing the 30-hp. gas-fired boiler, a 600-gal. hot water storage tank, and the electrical control board. The second section is a 50x29-ft. production area which contains the onion-peeling operation, and has horizontal processing retorts, and labeling and casing machines.

This section is connected with Area No. 3 by a 9-ft. doorway to permit transfer of filled and sealed cans in wire-mesh or perforated-steel trucks to the Area 4 processing retorts. It also joins Area No. 1, thus permitting the cased goods to be transferred on wheeled trucks directly to the stenciling station for immediate shipment. Or the cased goods go through Area No. 1 to Area No. 2 for shipping storage.

The office area, 21x45 ft., is across a portion of the front of the building, adjacent to the street and the side alley barrier. It connects directly through a doorway with processing Area No. 3, and indirectly with storage Area No. 2 through the reception entry.

Doorways between the connected areas are fitted with single or double swinging doors, which permit easy passage and may be opened or closed as atmospheric conditions warrant.

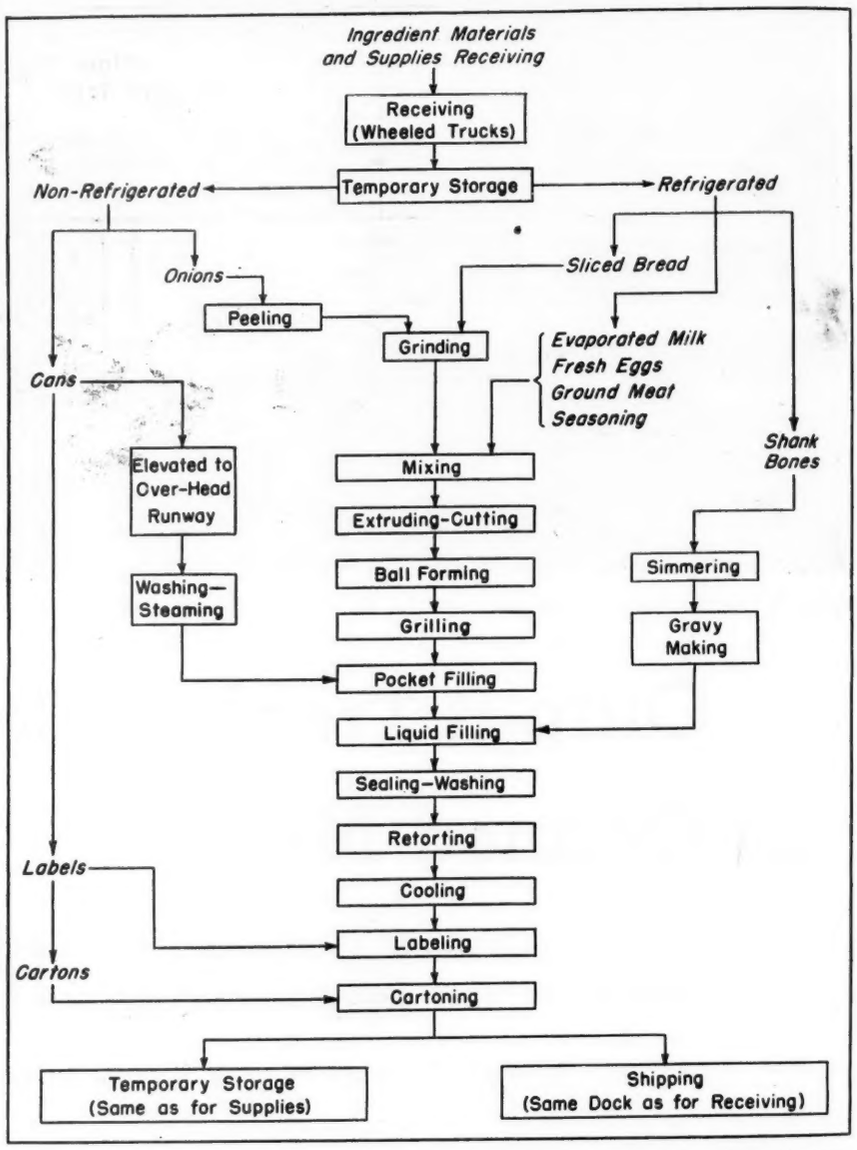
Effective Ventilation Provided

The cork-insulated ceiling of the central processing Area No. 3 has a 12½ percent upward slope to the outside wall. In the latter, four 24-in. motor-driven fans are installed above the windows to ventilate the area. This construction feature prevents moisture from condensing and then dripping from the ceiling, and steam and other vapors flow upward and out of the room without hindrance.

This feature also facilitates removal of smoke and fumes from the gas-heated cooking grill—to avoid accumulation of undesirable odors in the plant or unwanted flavors in the finished products, also to avoid discomfort to the employees. Two 24-in. fans and one 30-in. portable 5-ft. pedestal fan, positioned near the inside walls, aid in clearing out vapors and fumes and in drawing fresh air into the area.

Area No. 2 incorporates an 8-ton, 40-50 deg. F. storage room. Here, 350-lb. barrels of fresh ground beef, fresh eggs and other perishable ingredients may be temporarily stored, later to be transferred by wheel trucks through an adjacent doorway into the central processing room. This storage area (No. 2) has doorway connections with both the receiving area (No. 1) and central processing area (No. 3) to permit uninterrupted transfer of materials from the receiving dock to the processing area.

Fast-Flow Production Is Featured . . .



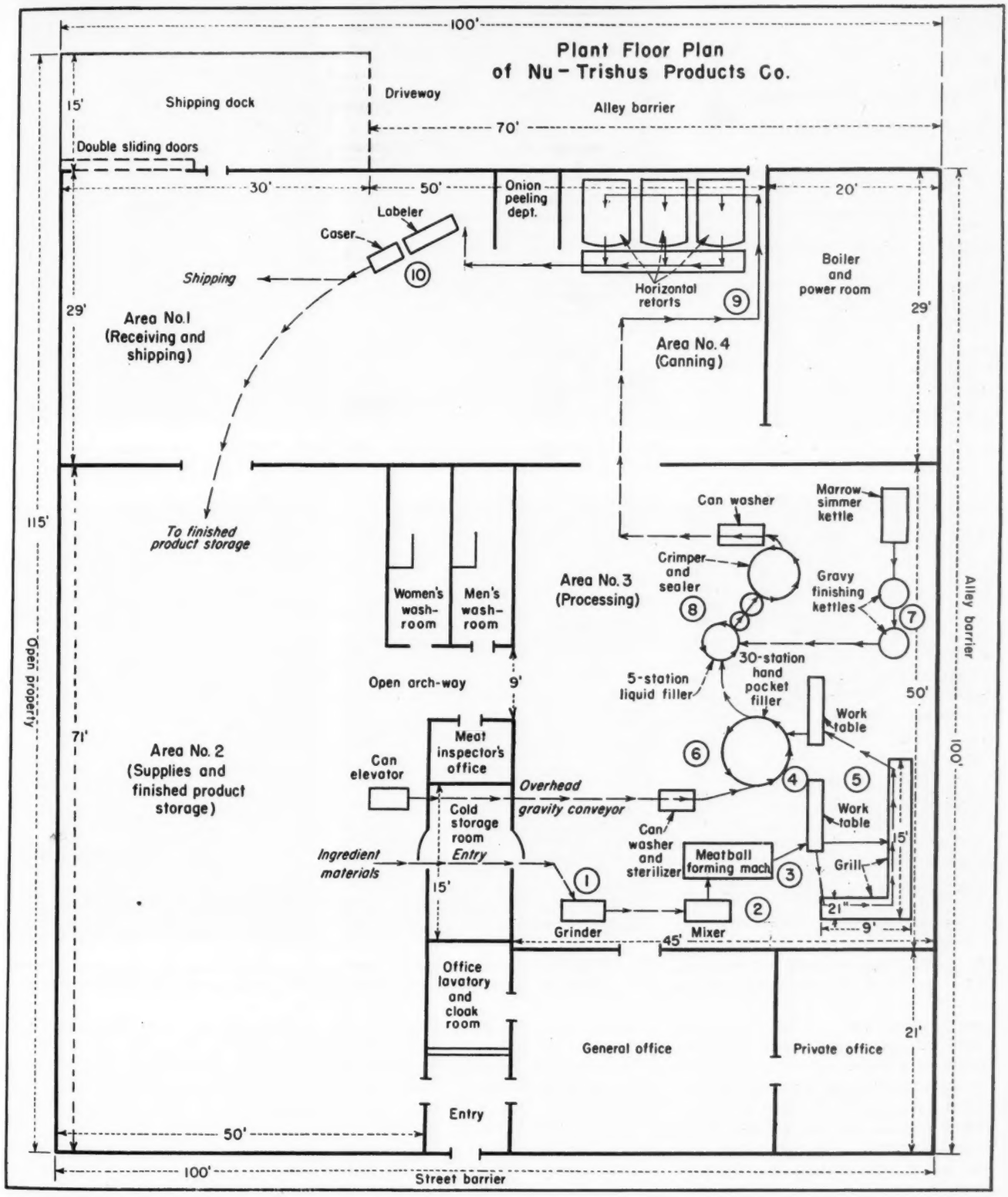
Straight-Line Operations

Equipment in the central processing area permits forward flow of the ingredient materials through grinder, mixer, meatball-forming machine, cooking grill, can fillers, can sealers and retorts, without appreciable delay. The production rate through this area is controlled chiefly by the rate at which the meatball cutting and forming machine operates. Manufactured by Alba Engineering Co., of Los Angeles, this unit operates under automatic speed control, adjustable to make as few as 150 meatballs a min. or as many as 350.

Production starts with the grinding and blending of the bread and onions in a motor-powered, screw-fed, extrusion-type food grinder. In predetermined proportions by weight, the bread and onion mixture is combined with ground meat, evaporated milk, eggs and seasoning in a 500-lb.-capacity, bread-dough-type mixer. The mixer is fitted with a motor-driven, single-arm agitator and a manually operated screw that tilts mixer and empties contents into stainless steel tubs on dollies.

These mixes are made with sufficient frequency to keep the ball-forming machine operating at the desired rate and to minimize the waiting period after mixing. At times, the rate at which the ball-forming machine operates also determines the size of each batch. Reason for this is that all operations are correlated: (1) To keep the production line in as continuous operation as possible to meet shipping instructions, while (2) minimizing waiting time between mixer and ball-forming machine, as well as (3) maintaining

. . . In Single-Floor, Readily-Expanded Layout



control over inventory of finished product in shipping storage.

When the operating schedule warrants, the installation of the necessary equipment, the grinding, mixing and ball-forming machines may be connected by mechanical conveyors. In this way, these operations will be automatically synchronized, with the elimination of waiting periods between grinder and mixer and between mixer and ball-forming machine. Thus, present batch operations will be converted to continuous, mechanized ones.

Forming Meatballs

The present production setup permits flexibility of operation—from the rate of 150 to 350 meat balls per minute—with the minimum of capital investment at a time when mechanical units are both expensive and difficult to obtain.

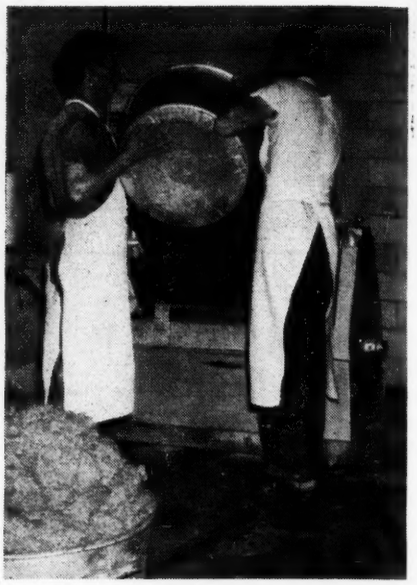
In its essentials, the ball-forming machine consists of a power-driven worm screw, under variable speed control, which forces the meatball mixture from the feed hopper through a nozzle and into the path of travel of a rotating wire-frame cutter. The rotation of this cutter is synchronized with the speed of the worm screw to form the extruded mixture into equal, uniform-length segments.

As these segments fall onto a stainless-steel mesh conveyor, they are brought into direct contact with a

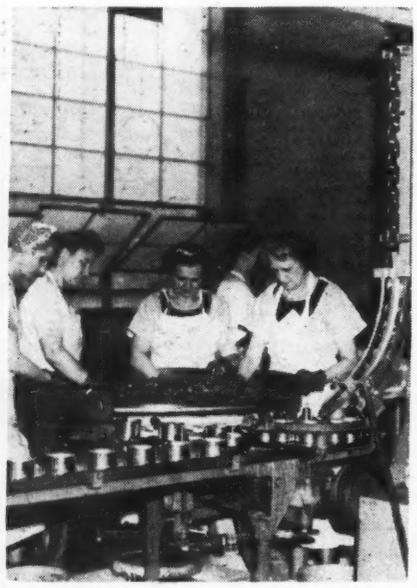
From Raw Materials To Finished Product

Making of canned meatballs—from initial grinding to final packing—is pictured in this sequence. Caption numbers key the photographs with the specific points indicated in the plant floor plan presented on page 79.

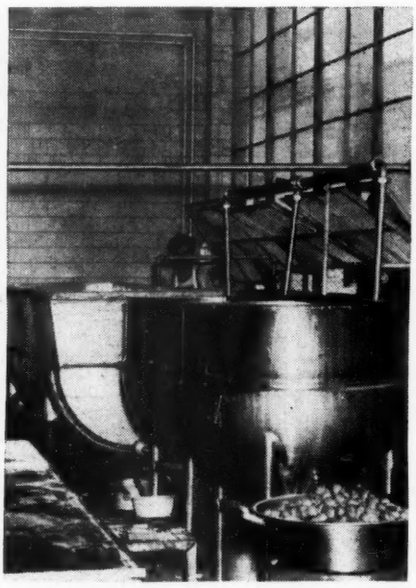
1. GRINDING bread and onions, using motor-powered, screw-fed unit.



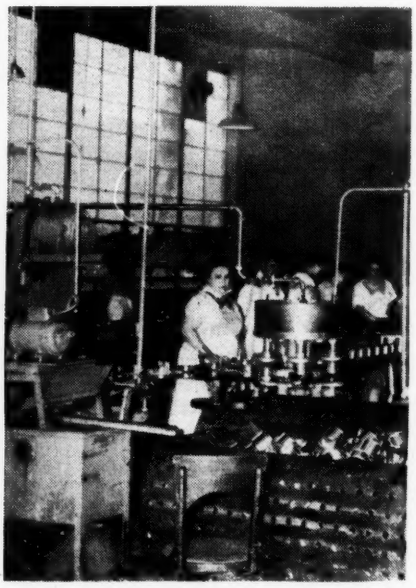
2. MIXING bread-onion blend with ground beef, and other ingredients.



6. COUNTING meatballs into sterilized cans, using 30-pocket hand filler.



7. PREPARING gravy in kettles (front). Bones are simmered in tank (rear).



8. FILLING gravy into cans. Closing, sealing, and can washing follow.

superimposed mesh conveyor. The lower surface of the upper conveyor travels at a slightly faster rate and in the same direction as the upper surface of the lower conveyor. This imparts a rolling as well as a forward movement to each segment. The upper conveyor also has a reciprocating lateral movement, giving the segments a symmetrical spherical shape.

Meantime, the balls are sprinkled with flour to prevent them from adhering while they travel to the discharge end of the conveyor. Also, the flour avoids loss of juices during grilling.

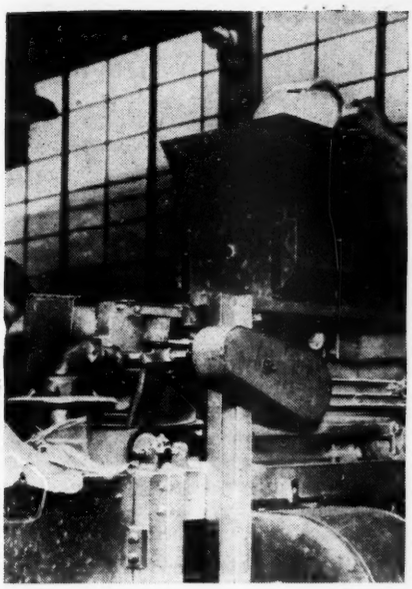
Sprinkling of the flour from a hopper immediately above the two mesh conveyors is controlled by a revolving valve feeder and by a vibrating movement of the hopper, which prevents the flour from bridging.

From the forming conveyor, the meatballs are discharged into 13x18-in. aluminum trays for manual transfer to the 21 in. x 24-ft. flat, gas-heated, steel-topped range. Here, they are grilled to a crisp, well-browned exterior in melted beef fat. Under normal operating conditions, there are two operators grilling the meatballs. However, the L-form installation of the range (see diagram) will allow as many as four operators to work without interfering with one another. Also, the gas burners operate individually so that only the required portions of the range need to be heated. The front of the range is fitted with a steel gutter into which the excess beef fat drains for collection, later to be sold as waste-fat.

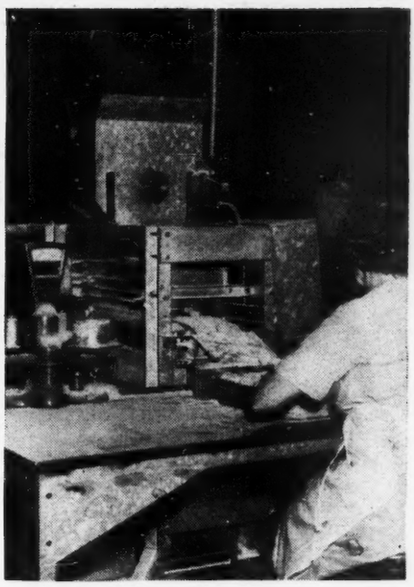
After the meatballs are grilled, they are manually removed into large pans and transferred to a 30-pocket hand filler. Here, they are put into cans which are delivered by an over-head gravity conveyor equipped with a hot-water washer and steam sterilizer. Each can receives 10 meatballs in the course of its circuit through the filler. Then it resumes travel on a continuous flat-belt conveyor to the automatic, five-station liquid filler, where gravy is added.

Preparing Gravy

Making the gravy is a side operation in the central processing area (No. 3). The gravy is prepared in the space along the outside wall between the end of the grilling range and the inner wall separating the processing area from the utility room at the end of Area No. 4. The equipment con-

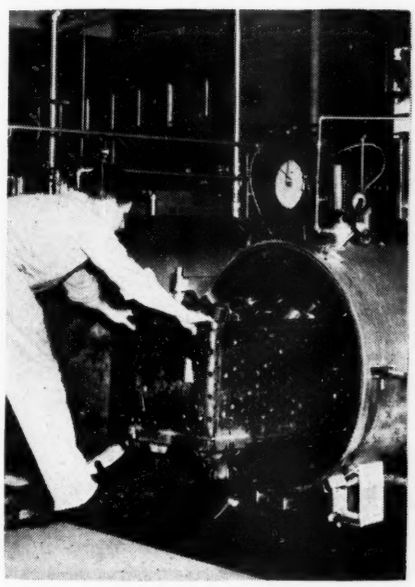


3. EXTRUDING mix through nozzle. Equal-length segments are made.

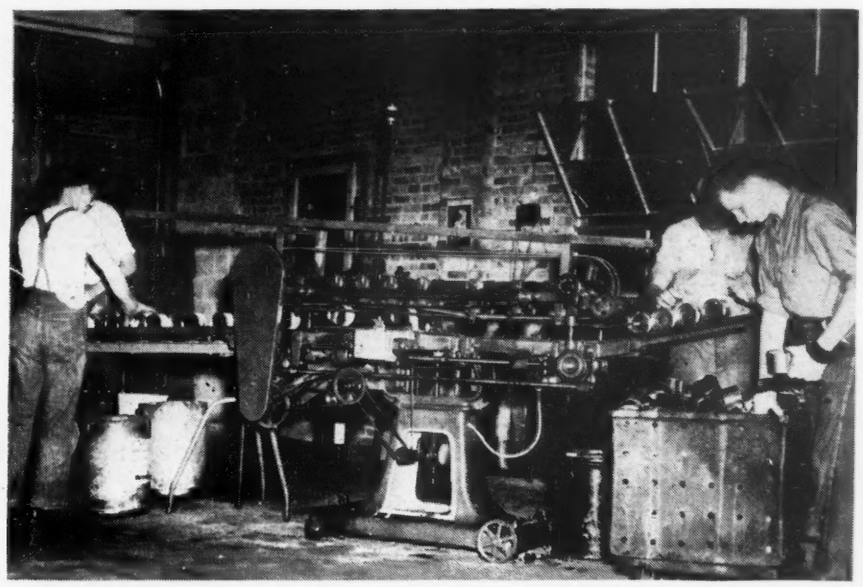


4. SHAPING segments between belts to form balls. Flour is sprinkled on.

5. GRILLING meatballs with beef fat, until they are crisp and browned.



9. STERILIZING and water-cooling cans on a systematic cycle in retort units.



10. LABELING, then hand-packing of cans into shipping containers that are later glued and sealed, complete the meatball-and-gravy canning operations.

sists of an 800-gal. rectangular steam-heated stainless steel tank. Beef shank bones are simmered in this tank so as to remove their marrow and adhering meat—thus forming a beef-flavored broth. The broth is then drawn off by rotary pump into two 100-gal. stainless steel jacketed soup kettles.

To the broth are added predetermined amounts of seasoning and flour to make a free-flowing gravy of the desired consistency when the flour has been gelatinized by controlled heating accompanied with gentle agitation to prevent lumping. This gravy is simmered and stirred periodically until pumped directly to the five-station liquid filler, which operates on the displacement principle.

After the cans have passed through the filler, they proceed to a standard crimping and sealing machine. Next, they go through a bath where gravy or other materials are washed off the cans. Then the cans are discharged directly into heavy-gage-wire or perforated-steel trucks, later to be transferred to the horizontal processing retorts in Area No. 4.

Retorting is done at 240 deg. F., followed by flooding of the retorts with water to speed-up cooling and to avoid over-cooking, which may occur if the cans are air-cooled. Furthermore, water-cooling in the retorts eliminates need for additional floor space for a water-cooling tank or flume. It also allows operation of the retorts on a systematic turn-over cycle.

The three retorts are set in a depressed portion of the hard-surfaced concrete floor, where there are adequate drains to permit discharge of the cooling water without flooding the entire floor of Area No. 4. Also, the exhausts on the retorts are vented directly to the outside of the building at about roof level to minimize steam condensation in the area and to prevent the windows from frosting during winter months. These details of installation shorten the operating cycle for each retort, and thus permit a greater number of loads into and out of the retorts per day than would otherwise be obtained.

Storage and Shipment

After withdrawal from the retorts, the partially cooled cans are permitted to drain and dry for a few minutes. Next, they are transferred to the label-

(*Continued on page 217*)

MARGARET VARGO, now assigned as a regular employee, does an efficient job packing pretzels into bags on production line. . . . Company got prior indication of her capabilities when she made a good showing in pre-employment tests.

Aptitude-Tested Workers Boost Pretzel Output

Vocational tests increase operating efficiency, raise morale because of correct job placement, and "weed out" applicants lacking qualifications

By JAMES L. DOOLEY, Personnel Division Director, Halter's Pretzels, Inc., Canton, Ohio

INCREASED efficiency bringing 15 percent higher production, improved morale among the workers, and reduced absenteeism were the direct results when, recently, Halter's Pretzels, Inc., of Canton, Ohio, installed a vocational aptitude testing system. Provided is a check on the capabilities of both present workers and job applicants.

The story of this development began when the pretzel firm recognized the need for new efficiency to meet high costs, yet found that conventional methods of gaging workers were inadequate.

"Couldn't some system be adopted," asked company executives, "for measuring workers before they were put on the lines—a system giving some indication of their potential ability to turn in a good performance in packing pretzels in bags and boxes?"

Pondering this question, they called upon the U. S. Employment Service for advice—and got their answer. The Industrial Services Division of USES sent two occupational analysts to the plant to study the application of aptitude tests in the pretzel baking industry. These experts worked closely with company officials. And after they studied operations on the pretzel lines, special coordination tests were set up to give the firm a tangible "yardstick" for calculating a worker's primary capabilities.

The system couples an initial screening interview and reference check of each prospective employee with the subsequent administration of the aptitude tests by the personnel manager. And it works. For since installation of these tests, there has not been a single case of a tested applicant failing to meet the standards after being hired. All have proved to be better-than-average production workers.

The company employs about 100 workers all told. From this group, the 60 girl operators were designated to take the tests, and their scores were then used to set up a new personnel schedule for the line work. In this new system, three two-girl teams were organized for each of the three shifts, making a total of 18 workers on team piecework. The remaining 42 girls were assigned to the regular-pay-rate work—operating mechanical pretzel twisters and automatic filling and weighing machines.

The three teams on each shift were

(*Continued on page* 215)

1. **A FRIEND first mentioned Halter's to Margaret. Interested, she applies for work, gets employment blank to fill out.**

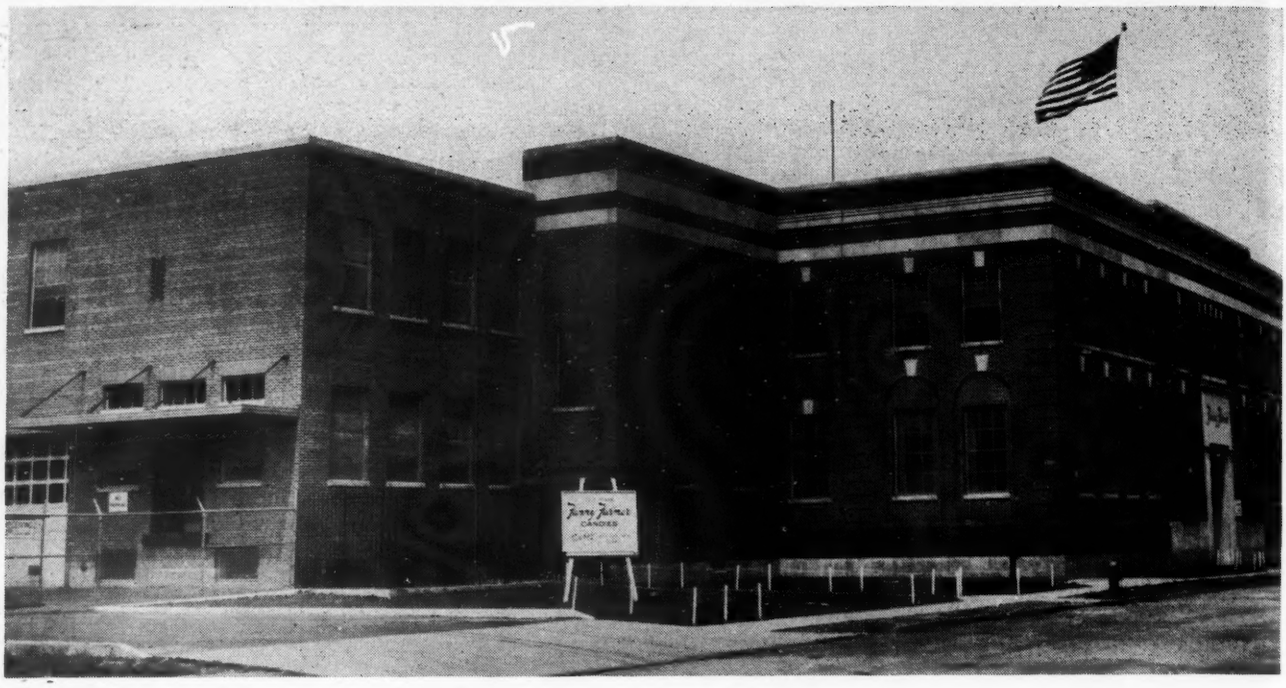
2. **SCREENING interview with personnel manager follows, and she sits tense on chair when told she must take test.**

3. **CROSS-LINING "H's" comes first. She shows ability to follow instructions, scores high in hand-eye coordination.**

4. **PEG-MOVING test is next, accenting arm-hand-eye coordination which is essential in doing pretzel-line piecework.**

5. **HER final hurdle is washer-and-rivet chore, calling for exacting finger dexterity. She hurries as stop-watch ticks.**

6. **CHECK of scores shows Margaret passed! Ready for work, she smiles as superintendent greets her out in plant.**



How Fanny Farmer Shops Succeeded In . . .

Engineering a Better Candy

New workshop for the candy making craft utilizes modern methods

By HALDANE GEE
Managing Editor
"Food Industries"

SANITATION, air conditioning, and improved arrangements for personnel are three important features emphasized in the modern New York kitchen which Fanny Farmer Candy Shops opened this year.

The new plant—described as a "studio" by Fanny Farmer—supplies fresh candies daily for the 75 shops it serves in the Metropolitan area. Its equipment and construction details were specially chosen for the smooth, orderly production of the relatively small lots required in the fresh-stock, home-made flavor type of operation on which the business of Fanny Farmer has been built.

Prior to design of the new production unit, the increasing demands of the New York shops were met by additions and alterations to a group of buildings in Brooklyn. But these facilities became severely overtaxed with the release of raw materials after the war. Accordingly, a new building with new equipment was decided on, to be engineered from the ground up for convenient and efficient manufacture of quality candies. This objective was achieved in the modern plant placed in operation last spring in the Bronx, New York City.

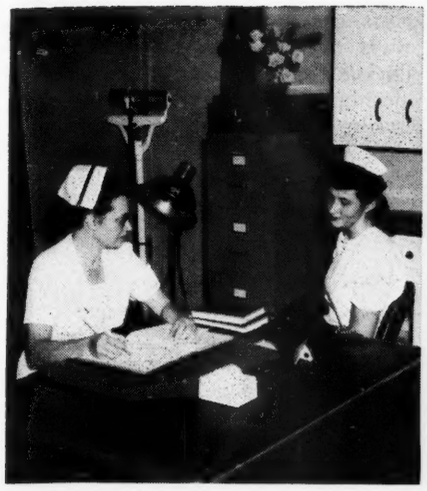
A full year of study and debate preceded the actual drawing of building plans. Fanny Farmer's objective was to provide a new workshop for the candy making craft, while utilizing modern methods to the fullest extent. Emphasis was, however, directed away from bigness, in line with long established policy of the organization.

Moving spirits in the project were John D. Hayes, chairman, and James F. Burke, executive vice-president, of Rochester, N. Y., headquarters, along with Leonard D. Griffiths, New York area district manager, and Wallace R. Arbuckle, plant superintendent. On Mr. Griffiths, 18 years with the organization and familiar with special problems in the New York area, was placed the main responsibility for coordinating efforts of architects and equipment builders, utilizing the best practice of the industry, and retaining the special technics of the Fanny Farmer business as worked out in eight regional studios over a 30-year period.

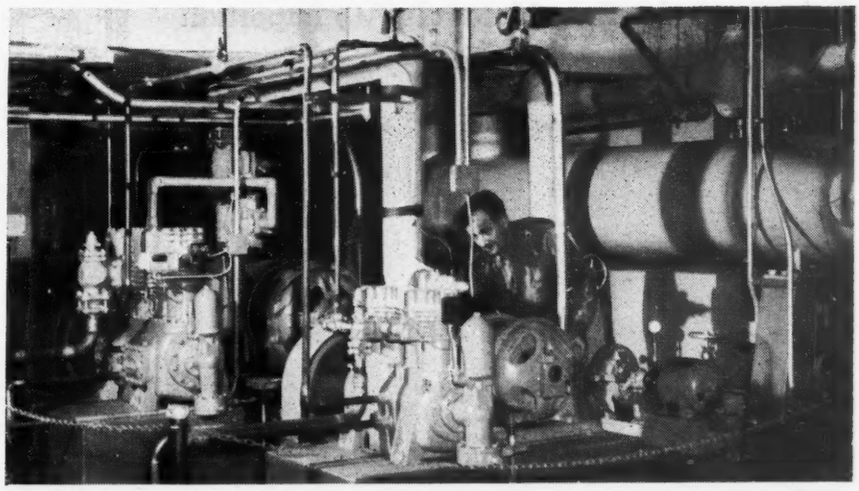
Airy and well lighted, the new Bronx building, 200 x 250 ft., is in keeping with the Fanny Farmer "studio" type of production unit. Two rules were paramount with the architects and engineers for simplifying sanitation and maintenance. First, the architectural materials were chosen with the object of eliminating the use of paint in processing areas. Second, the areas for equipment are large enough so that machinery is kept well away from walls, and all machines are mounted at least four inches above the floors.

Ceramic tile is used on walls, with tiled ceilings in the cooking department. The tiling job is one of the largest installed in New York, according to the subcontractors who handled it. In order to control ceiling drip from the kettles, an elaborate exhaust system is used which minimizes condensation on the ceiling surface.

Three methods of venting are used in the various cooking areas. Small cooking kettles are arranged in line under a long, tiled hood. This carries away fumes from the gas-fired kettles where brittles are made, and conducts away vapor and odors. Fondant beaters have individual hoods centered over the individual units. Caramel kettles are fitted with exhaust pipes



1. **HUMAN** engineering improves personnel relations, safety record, sanitation.



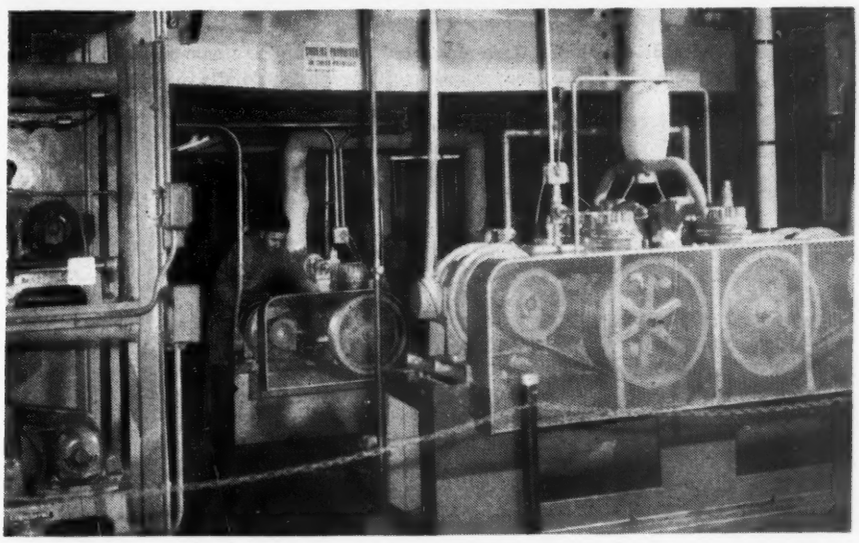
2. **AIR CONDITIONING** is provided by four separate Carrier-Freon systems. Shown are 25 and 50 ton units for main processing room. Either or both may be used.

ADVANCED FOOD PLANT ENGINEERING

12th of a Series

Kitchen

to the fullest extent



3. **COOLING** equipment (foreground) for enrober tunnels is in duplicate—20 tons in service, 20 tons spare. Shipping room has two units (rear), each 15 tons.

that are run up through the ceiling.

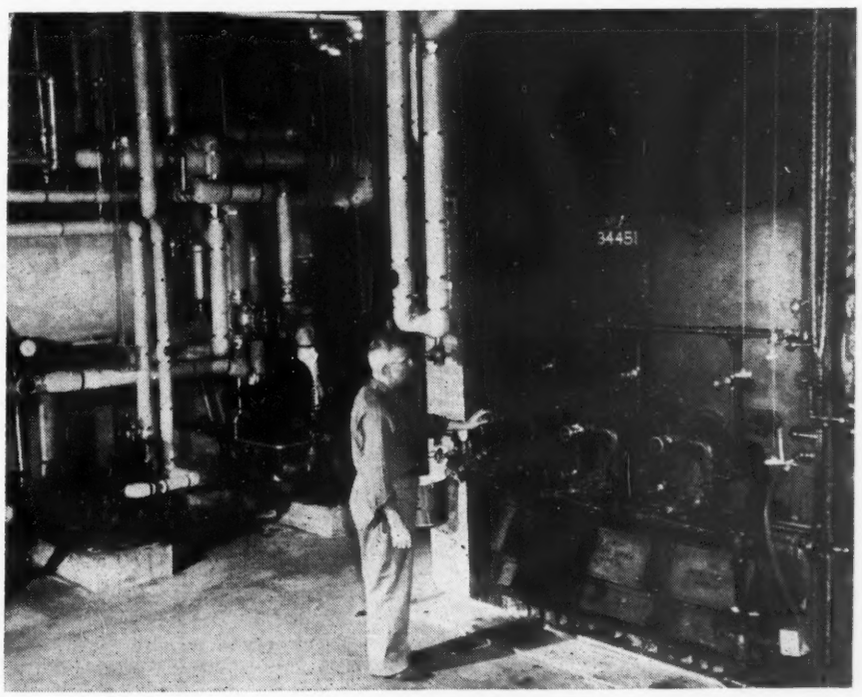
Ceilings in non-cooking areas are covered with plaster and marble dust, which gives a white finish. Floors are of Schuster-arch construction, with a top coat of Kalmine. In this design, a 3-in. concrete slab runs over 5-in. concrete arches. The arches are filled in with hollow tile, which gives a ceiling surface free from ridges and projections. The Kalmine process gives the top of the slab an exceptionally hard surface.

Window frames are of aluminum. Exposed pipes are treated with chrome metal paint. These various details, together with the extensive use of glass, are expected to eliminate all possibility of paint peeling, and to avoid the expense of periodic redecorating.

Sanitation Simplified

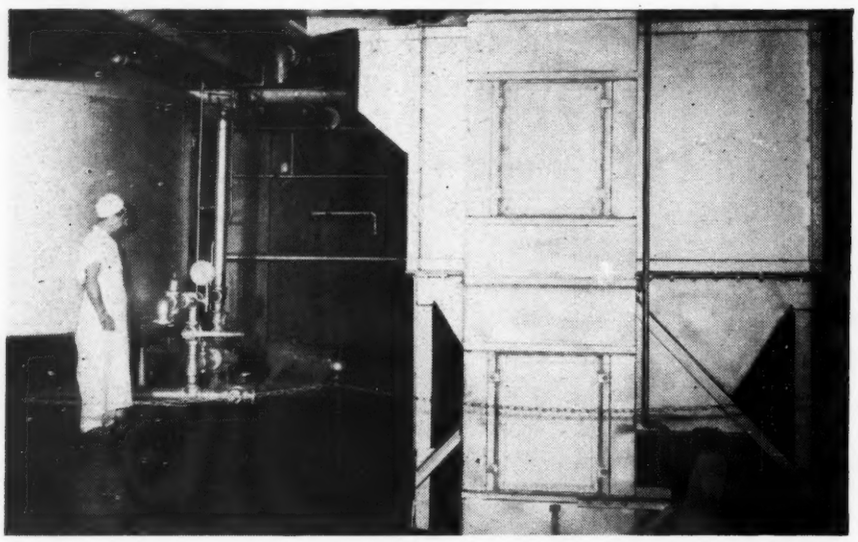
Construction details which simplify the sanitation job include floor drains throughout the building, and the use of cove base and rounded corners everywhere. All machines are set on pipe legs to facilitate cleaning underneath them and to guard against unsanitary accumulations on the floors.

It is worth noting that the sanitation routine, although made easier, is under

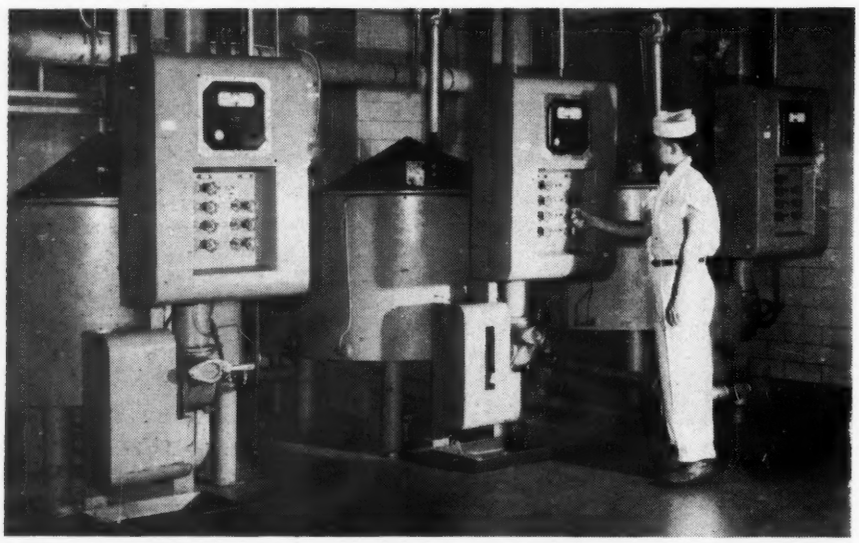


4. **TWIN BOILERS**, each 150 hp., burn standard No. 5 fuel oil supplied by pressure pumps to atmospheric burners. Condensate return (left) is high and low pressure.

Safeguards for Raw Materials Are Important



5. **SUGAR is handled in bulk. Corn sirup tank (left) can be steam-pressure sterilized. Dry sugar bulk bin (right) feeds automatic conveyor system.**



6. **CHOCOLATE melting kettles have automatic temperature control. Pipelines are electrically heated by low-voltage current applied to piping sections.**

7. **INGREDIENTS, including nut meats and egg, are held at low temperature. Fruits, cream, creamery butter are shipped in fresh every few days, as needed.**

constant surveillance. There are always two or three porters on hand during working hours, but the main cleaning staff works at night. Its work is checked periodically by a sanitation committee which includes the assistant superintendent and foremen department heads.

Box Washing Unit

Although mechanical washing equipment is not ordinarily of major importance in a candy plant, there is a step in the Fanny Farmer operation which calls for a box washing unit. The fresh candies are trucked to the shops in bulk in metal containers holding about five pounds, with packaging usually done by hand in the shop as the customer waits. Empty containers are returned to the studio. Here, paper covers and linings are discarded. Then the boxes are sent through the automatic washer. This unit, made by Metalwash Co., N. J., also dries the boxes.

Air Conditioning

Another fundamental feature of the building is special construction providing for temperature and humidity control. The control limits in any area depend on the specific operation. Although intended primarily for production operations, the air conditioning installations do add to employee comfort.

Air conditioning equipment is arranged in four separate systems, with direct refrigeration capacity in addition. There is provision for partial exchange of loads. Since any interruption of service in the dipping room would stop operations, the air conditioning contract provided for a spare motor and compressor for this area.

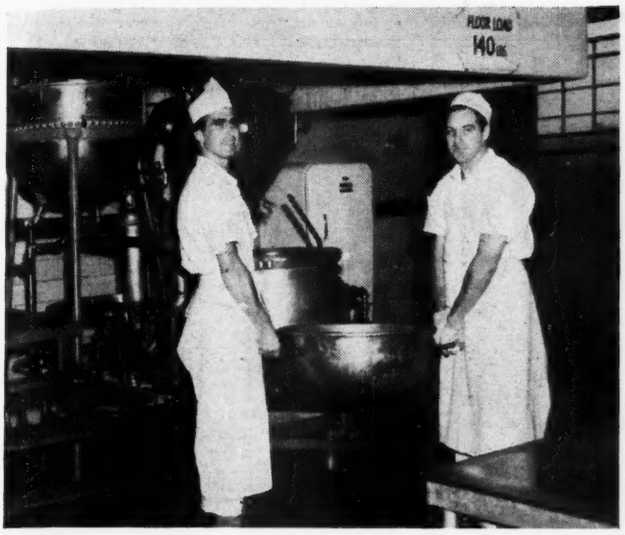
One dual unit serves the four enrober cooling tunnels, with 20 tons in service and 20 tons standby. Shipping room has a dual unit which maintains 65 deg. F. and 50 percent RH, with two 15-ton units required here. Processing room has two units, one of 25 tons, the other of 50 tons, either or both of which may be used for maintaining the established conditions of 75 deg. and 40 percent RH. The centers curing area also has its own service, with 25 tons required, which maintains conditions at 65 deg. F. and 50 percent RH.

Of the refrigeration units, there are four for the enrober cold slabs, one serving each machine. There are additional refrigeration units for the refrigerated storage where fresh ingredients are kept.

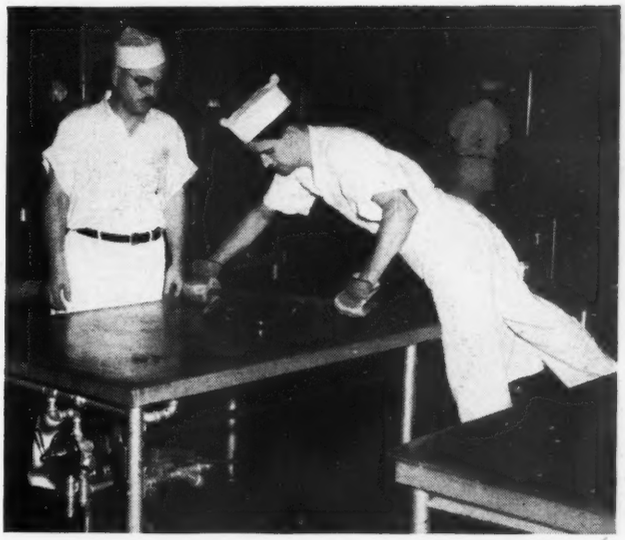
Special Conveyors

With ample space to work in and a minimum of cross traffic, it was possible to conveyorize the Bronx plant to

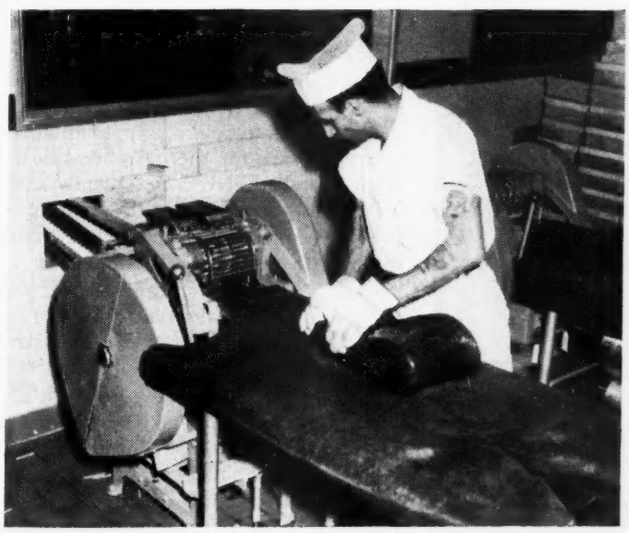
Batches are Adjusted for Close Control and Easy Handling



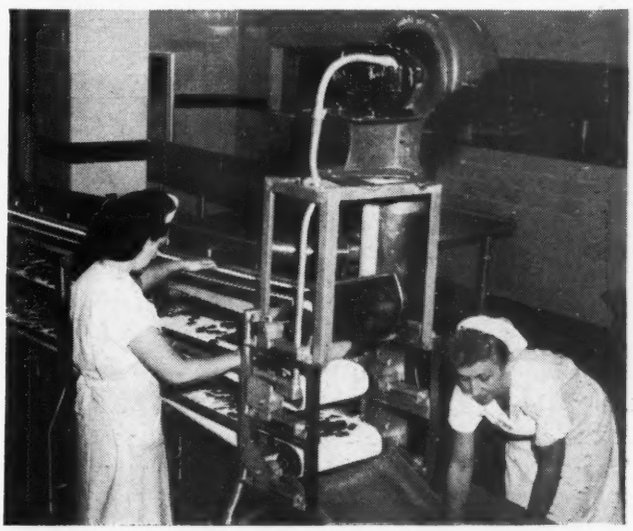
8. **HARD CANDY** unit includes premelt kettle (left), vacuum kettle (cover raised), and hand-pouring kettle for batch.



9. **SLAB** for working and flavoring batch is hot water heated. Temperature is regulated with mixing valve.

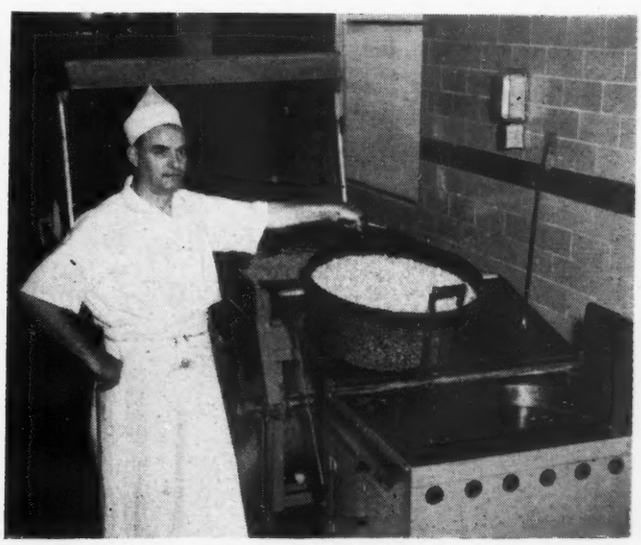


10. **LOLLIPOP** machine uses paper "sticks". Blanket helps control temperature, hence consistency, of material.



11. **BLOWER** cools "pops" on 3-way conveyor. Lollipops are brittle enough to separate at end of first pass.

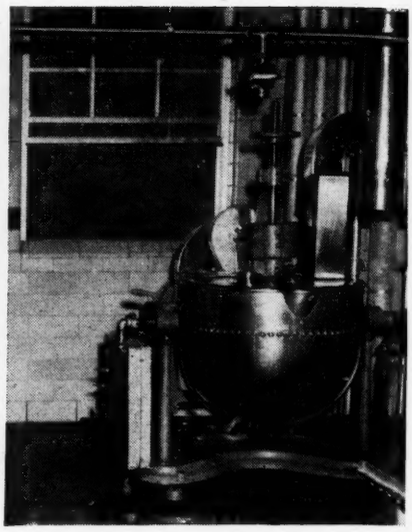
12. **NUT MEATS** are examined on inspection belt. Tramp iron magnet is built into base of hopper at end of table.



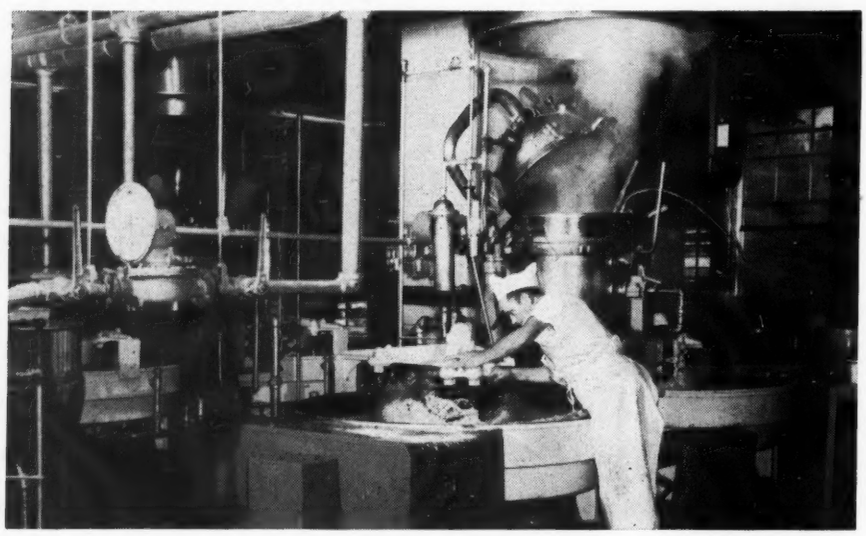
13. **INSPECTED NUT MEATS** are deep fried when intended for salting. Nuts for candy centers are dry roasted.

Ceramic Tile, Good Ventilation Are Features of Cooking Areas

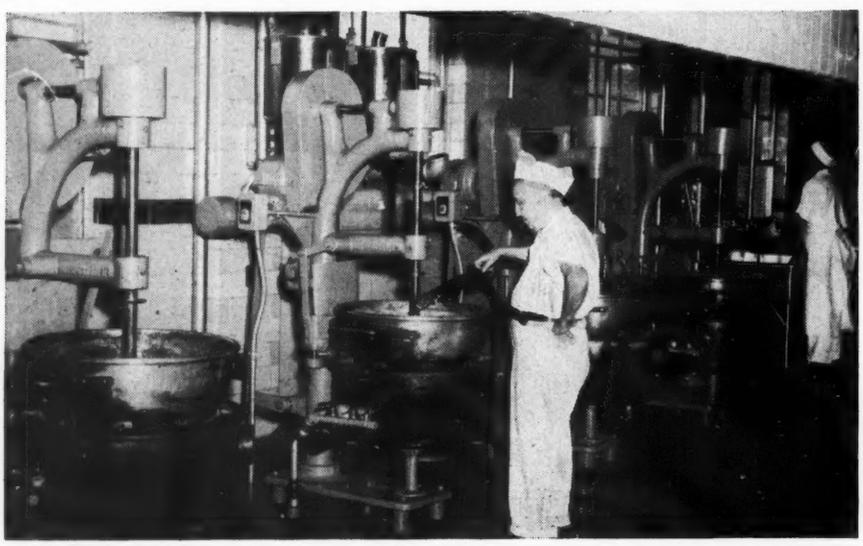
14. DAIRY-TYPE UNITS are employed for making caramel base mix. Shown here are mixing tank, homogenizer, and holding tank or "pasteurizer".



15. CARAMEL MIX is finished in kettles here. Note aluminum window frames.



16. FONDANT equipment includes, left, premelt kettle and sirup line; top right, vacuum kettle on trunnions; center, beater where creaming takes place.



17. CRISPS and chips are made in gas-fired kettles set under canopy. Bases of equipment are raised on pipe legs to facilitate cleaning operations.

a large extent. This is in line with the policy of eliminating the handling of candies by personnel wherever possible.

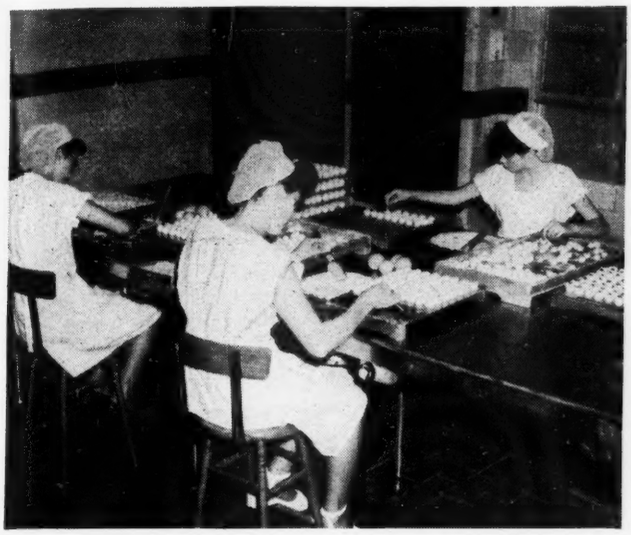
The two outstanding applications of conveyors are for the movement of the empty and filled 5-lb. metal stock boxes or tins. Sterilized, empty tins are moved on belt conveyors either directly to the packing room floor or else to a basement storage area if tins are coming in faster than they are being filled. In either case, a constant supply of tins moves through the areas where stock is being finished. The filled tins are returned to the stock and shipping room, where they are held on roller stock racks four levels high. Racks are the width of a box, but each level permits stacking boxes several high.

This stock system required a total run of 4,000 ft. of roller conveyor. Although expensive initially, it saves a great deal of labor in the shipping room. Formerly, a staff was required to consolidate and rotate stocks every day to insure freshness of the goods on the shelves and to maintain the first-in, first-out movement. Now filled tins are loaded on at one end of a rack. They are taken off at the other end, one box or a stack at a time. The stock progresses to the shipping end automatically.

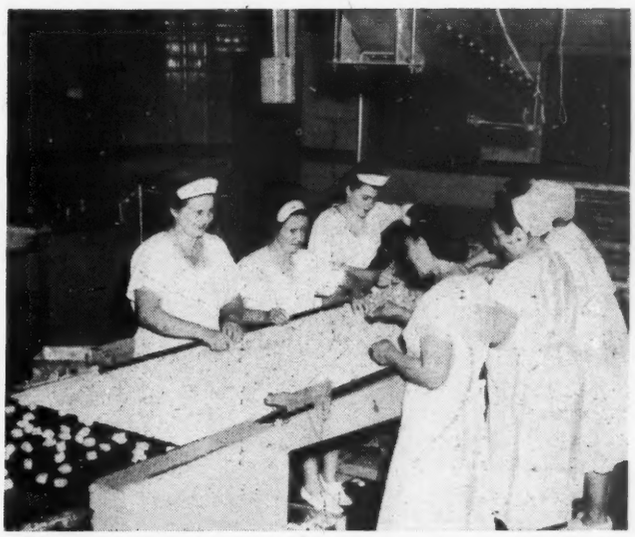
Bulk Materials

Maximum use is made of piping systems in the handling of raw materials. Dry sugar is received in bulk and stored in the basement of the building. An automatic conveyor fills a 100-lb. hopper or an upper floor where the sugar is used. A Syntron vibrator feeds it down from the hopper for weighing.

Hand Skill Has an Important Place in Coating Operations



18. BONBON dipping table has electrically heated pots. Dippers grate fresh fruit for the coating as needed.



19. CHOCOLATE COATER belt is loaded with maple walnut centers. Pieces are moving onto bottoming unit, lower left.

For liquid sugar, two storage tanks are provided. The sirup is distributed through the plant by an automatic pressure system. Pumps at the basement storage supply a small elevated air pressure tank. Feed is accordingly a combination of gravity and pressure. As sugar is drawn, the pressure falls and the pumps are cut into operation.

Corn sirup is supplied from another basement storage tank, also arranged for automatic pressure feed. The sirup tanks are permanently piped for easy washing out, and for steam pressure sterilization at 80-90 psi.

Chocolate, received in cakes, is passed through a breaker, then melted in one of three kettles in a special chocolate room in the basement. The chocolate is hand tempered, and then automatic temperature control is switched in. Sanitary pumps move the chocolate through a special electrically heated line with Fluid Systems heat control. In this equipment, a low-voltage current is applied directly to the pipeline. Chocolate is recirculated. The materials handling arrangements in general make for convenience and cleanliness, and are important labor saving factors.

Human Engineering

In planning the Bronx studio, careful attention was paid to problems of human engineering. The Fanny Farmer organization has for some time emphasized personnel relations, a policy which is reflected in the building arrangements in various ways. Most personnel matters, aside from on-the-job supervision, are handled by a personnel official, a trained industrial nurse, who has charge of employee selection and hygiene. A well equipped dispensary and interviewing room are centrally located on the main floor of the plant. The directress of personnel tours the plant at least once a day with an eye to enforcement of the rules on employee attire and plant housekeeping.

The company provides hair nets, caps and uniforms. Nail polish is not permitted and no jewelry is allowed. Soap dispensers throughout the plant are kept filled with Emulsept as an antiseptic and bacteriostatic agent. Shower baths are provided. The plant is one of the few to install toilet seats with ultraviolet germicidal lamps.

Personnel Policies

Fanny Farmer personnel policies include generous insurance and pension benefits. The personnel program is regarded as an important factor in the excellent plant safety record, with good housekeeping an important secondary factor. Safety provisions, as constantly enforced and revised, are such that the few minor accidents as may now occur can usually be traced to inexplicable employee failure.

In a 13-week period of 1948, a total of 178,000 man-hours were worked with but 26 accidents. Total time lost amounted to 70 days. This is with a working force which may reach 300, including 50 men and 250 women.

One important element in good employee relations—steady employment—has been worked out successfully over the years, despite Fanny Farmer's fresh candy policy, which might be thought to entail erratic production and sharp seasonal fluctuations. The winter busy season load is handled by seasonal additions to the staff, and by overtime.

Day-by-day fluctuations are smoothed out on the basis of 25 years of production scheduling experience, plus the design of all equipment for the convenient production of relatively small lots. Production for any given day at any of the Fanny Farmer studios is set up tentatively the day before, on the basis of shop sales and inventory records. Adjustments are made, if necessary, the next morning. It is possible in this way to maintain a uniform rate of production, and at the same time to make shipments to all stores three times a week.

Departmentalization in the plant and preservation of old sales records in the office are useful aids in gearing production to sales. As a final leveling-off aid, the Fanny Farmer organization has developed hot weather candies which help maintain patronage in the summer months.

Facilities for storage and warehousing are not major in the Fanny Farmer studios, again by reason of the fresh candy operation. There is almost no storage of finished stock. Exceptions to the rule are cherries, which need two or three weeks to liqueur, and fruit creams which need time for the fruit acid to act.

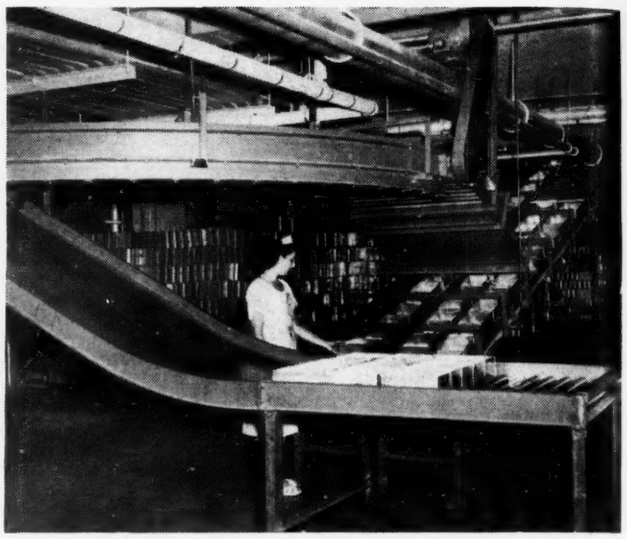
Cold Storage for Ingredients

Cold storage space is provided for limited quantities of ingredients, including nut meats, cream and butter. Fresh fruits (lemons and oranges) are bought two or three times weekly.

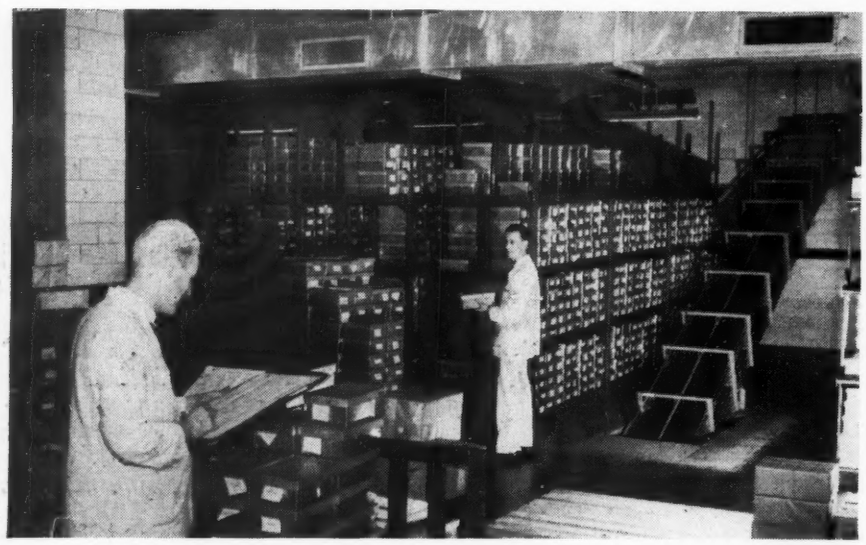
The general policy in purchasing is to buy through Rochester headquarters any ingredients where flavor standardization is important. Rochester usually makes the contracts for nut meats, chocolate and sugar. The local studios buy perishable products, since some, including cream and butter, are required on a daily basis. Laboratory control of ingredients is handled directly at Rochester. Periodically,

Conveyor Installations Save Labor, Increase Efficiency

20. STOCK TINS, returned from shops, go through washing machine, then discharge on conveyor belt. Left, trays.



21. STORAGE space for stock tins assures uninterrupted operation. Tins are conveyed to packing stations.



22. SHIPPING ROOM, air conditioned, has 4000 ft. of roller-coveyor shelving. New stock is loaded at rear, moves forward by itself to front of rack.

23. PACKING the 1-lb. box is a semi-conveyorized operation. Assortment is made up from 5-lb. stock tins as cartons move along belt in front of packers.

samples are sent to this laboratory by the studios.

Chunks and Pieces

A feature with Fanny Farmer, of production and promotion interest, is that—in keeping with the emphasis on freshness—the formulas provide for chunks or pieces of nut meats or fruits for which the Fanny Farmer candies are designed. In the case of miniature candies, it is more difficult to get the same volume of ingredients in the centers. Fillings, also, are usually chopped fine for the smaller candies.

Similarly, no change has been made to date in the plain white, printed box which has been the standard Fanny Farmer trademark since the inception of business, along with the simple white store decoration and ruffled curtains. Emphasis has been placed throughout on the old-fashioned, homemade and fresh taste of the chocolates, rather than on periodic package restyling. Also, since the retail boxes are usually packed in the shop with the customer's selection, there are no high speed packaging line problems which might dictate changes in the container.

Although Fanny Farmer contemplates no change in product, there already are ideas for further improving production. The new Bronx plant will care for the current demand for the 30-year old line. But the company executives have a list of still newer features for any future studio unit. This falls in with the experience that the building of one good plant often results in even more advanced ideas for an even better plant. In this respect, plant construction is no different from home building. The home builder usually feels he can design a further improved house, the next time.

Groundnut Project Advances

East African wasteland is being converted to productive farmland for raising high-oil-content groundnuts

PROGRESS is reported* by the United Kingdom's project for raising groundnuts in East Africa, as a step in easing the world-wide shortage of fats and oils. The program for 1948 aims at having 100,000 to 150,000 acres of waste, bush and woodland ready for planting before the rainy season begins in December.

Groundnuts, better known as peanuts, yield 42 percent edible oil when crushed, and also a cake of considerable protein value as cattle feed. In all, the six-year program aims at the production of 600,000 long tons of shelled nuts per year, with an oil equivalent of 250,000 long tons. A total of 3,250,000 acres will be turned into productive farmland.

The areas selected for clearing lie, principally, in five large blocks in Tanganyika and in smaller areas of Northern Rhodesia. Initial development has been in the central province of Tanganyika, 240 miles inland from the port of Dar-es-Salaam and a few miles north of the central railway line.

Difficulties Overcome

During 1947, the first year of the program, the necessity for improving the transportation system, importing and repairing the 100-130 hp. crawler tractors and bulldozers, and designing and building special root-cutting implements caused unavoidable delays in the clearing of the land. Only about 7,500 acres were ready by the end of the first planting season, and a token crop was harvested.

In April of 1948, the responsibility for the project was given to the government-sponsored Overseas Food Corp., which is pushing ahead with the program. Engineering and construction necessary will include the building of a new port with deep-

(*Continued on page* 215)

FLEETS of tractor-drawn rooters clean the land. New root-cutting equipment had to be designed for extracting the long, interlaced, rubbery roots.

FERTILIZER is spread by hand from trucks. Soil conservation is an important phase of the program, nutrients being added to the land where beneficial.

SEED, unloaded here, will be the basis for an eventual crop yield of 600,000 long tons of nuts per year, by the end of the six-year development.

* In a recent review of the operations, prepared by P. J. Bathurst, of the staff of the Overseas Food Corp. of Great Britain. Pictures courtesy of British Information Service.

Years of research by an engineering firm resulted in the development of special equipment for preparing creamy, natural-flavor apple juice. Process, now in use at a large California cannery, is available to other canners for making a similar product.

Quality Apple Juice Made

By C. R. HAVIGHORST
Associate Editor
"Food Industries"

UNLIKE the clear or cloudy amber-colored products widely marketed as cider or apple juice, comminuted apple juice is of creamy texture and consistency, containing the required amount of solids in the form of finely divided particles of apple.

It retains most of the qualities of fresh apple—the color, the flavor, the aroma and substantially all of nutritive and therapeutic values of the fresh fruit. These characteristics were attained after careful research and test production in New York, California and Canada. Today, comminuted apple juice is produced on a commercial scale in a large northern California cannery.

The story begins about ten years ago. A group of food technologists and engineers in The Schwarz Engineering Co., Redwood City, Cal., led by James D. Dole of pineapple fame, started to explore the possibilities of developing an apple product possessing most of the qualities of a fresh apple in prime ripeness—a product that had better keeping qualities than fresh fruit, that minimized storage-space requirement, handling, losses and attendant costs. Special equipment had to be developed, and information gathered on processing methods.

Process and Equipment

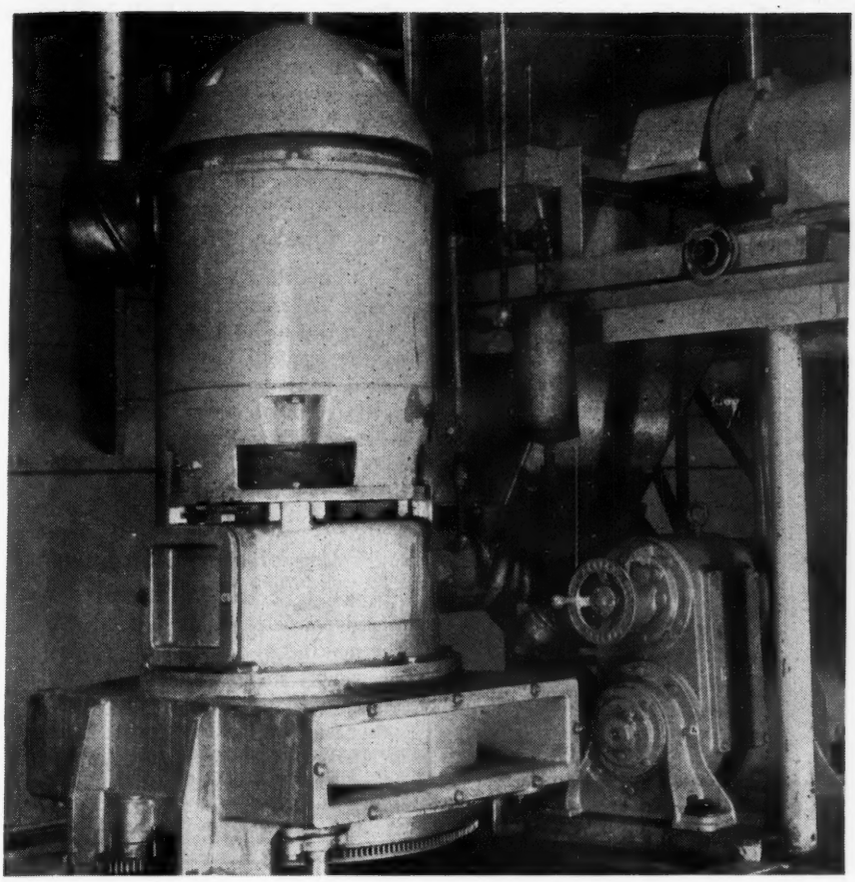
The key unit of equipment for making comminuted apple juice is the patented Schwarz comminutor-extractor (shown at right above). This unit, together with certain supplementary items, was developed primarily for the continuous extraction of apple juice. It also has a ready use for the extraction of juices of various fruits and vegetables. In operation, whole, sound apples of required variety or varieties, and of proper ripeness, are fed into the chopper and pass directly into the comminutor-extractor. Here they are pulverized, and the juice, together with desired solids, is separated from pomace which contains the skins, seeds, core tissue and excess pulp.

The Schwarz comminutor-extractor (Fig. 1) consists essentially of an electric motor (1) driving a rotor mechanism (2), at approximately 1,800 rpm., inside of outer case (3). Materials, fed into feed hopper (4), are carried by screw conveyor (5), driven by variable speed mechanism (6), into chamber (7). As materials contact the star wheel (8), they are chopped and thrown by centrifugal force against breaker ring teeth (9). Here they are macerated into smaller bits as the material moves downward and is forced through a first comminution stage. Clearances between rotor and case are adjusted at point (10) to prevent too rapid movement of material through the machine.

Screen Separates Juice

Materials moving downward are picked up by fingers (11) and are pressed and rubbed against a cylindrical screen (12). Screens employed are of special construction, and are sized according to number of openings per sq. in. of screen area. For some purposes, a fine screen with 6,400 openings per sq. in. is used; for other purposes, screens of 1,100 openings may be used. Juice exudes through the screen into collecting ducts and lines for processing.

The pulpy materials, with remaining juice, pass through a second comminution stage at ring (13). This can be adjusted to provide any degree of fine-



With Comminutor

ness of grind for final extraction, which takes place between fingers (14) and screen (15).

In this case, likewise, juice exudes through the screen (15) and pulp passes downward through restraining ring (16), which can also be adjusted to retain materials longer in the last separating stage or provide for free flow.

Comminuted Juice

The flow diagram, Fig. 2, shows steps and equipment required for making comminuted apple juice and its sauce-type companion product. Referring to the diagram, the apples accepted for processing enter at point (1), where they are passed through an acid bath wash. Here, spray residues, wax, leaves and other contaminating substances are removed by the cleansing action of a warm, slightly acid solution. Apples pass from the acid bath through a water bath (2) and a water spray rinse (3) to remove any traces of the acid.

The apples move to the sorting table (4), where they are culled and trimmed. Clean, sound apples travel along the sorting table to hopper (5), where they are picked up by elevator (6) and fed into chopper (7). The apples are chopped here and passed directly into the comminutor-extractor (8), which reduces them to a pulpy mass and simultaneously separates juice from the pomace.

Entering the closed processing system at this point, the juice retains the color, flavor and fragrance of fresh apples. Pomace, as it separates, drops from the comminutor-extractor onto conveyor (25) for use in the manufacture of sauces or other by-products.

Juice, on leaving the comminutor-extractor, passes through control valve (9), which serves to prevent entrance of air into the system due to variation in juice flow, then enters detector (10), which actuates an alarm in event of irregularities in juice production. From here, juice enters deaerator (11), is picked up by pump (12), which forces it through pasteurizer (13), where it is heated rapidly to the 200-210 deg. F. range before entering surge tank (14).

Thereafter, the juice passes through homogenizer (15) to filler (16). Filled containers are carried to closing machine (17) and thence in conventional manner to can washer (18), 3-min. hold conveyor (19), can cooler (20), can dryer (21), labeller (22), case packer and sealer (23 and 24), and to storage.

Apple Sauce

Pomace, in the meantime, has been carried by conveyor and elevator (25 and 26) to pulper (27), where water is added to facilitate separation of apple meat from seeds, core tissue and skin particles. The apple meat then enters pump (28) and is forced through flash heater (29) into steam jacketed kettles (30), where water, sugar and citric acid are added to produce a sauce-type apple product. This is usable either as a dessert or as a fruit filler in bakery goods. The sauce is drawn from kettles (30) by pump (31) and is delivered to filler (32), carried to closing machine (33) and thence in conventional manner to can washer (34), hold conveyor (35), can cooler (36), can dryer (37), labeller (38), case packer and sealer (39 and 40), and to storage.

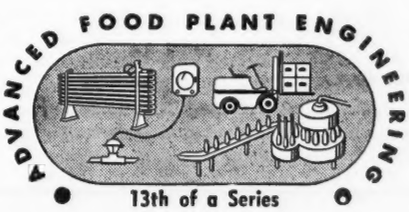
Utilization of the excess pulp need not be confined to the sauce by-product described above; other possible uses are for extraction of pectin, for manufacture of apple butter, for stock feeds, and for insect baits.

General Considerations

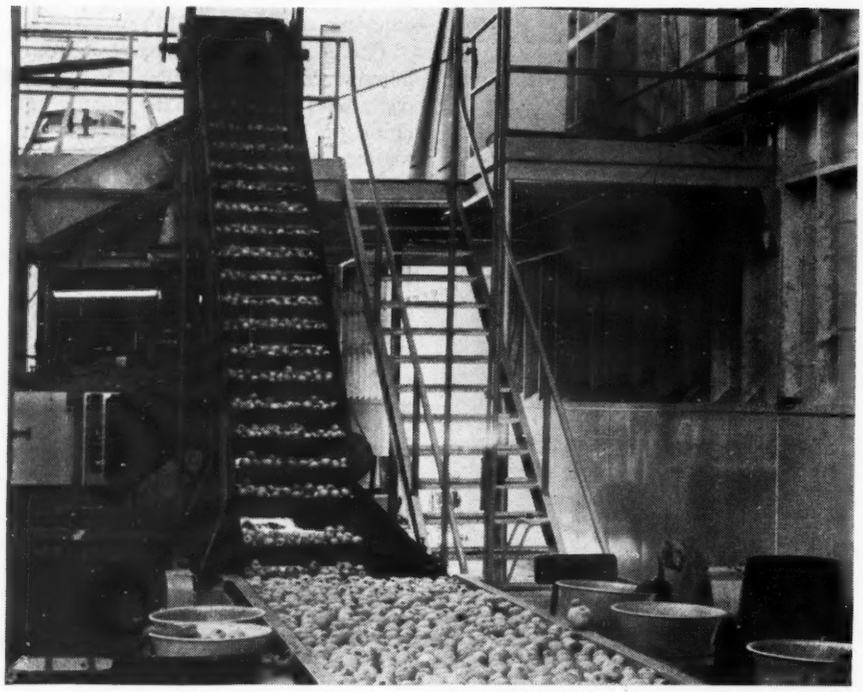
The making of comminuted apple juice requires careful selection of apples with reference to varieties, juice characteristics, and degree of ripeness, as well as condition and defects of the fruit. Some varieties of apple make an exceptionally fine type of juice; others make a good juice; and still others a juice of a lower quality.

Without experience, it would be difficult to predict which varieties are best suited for juice purposes and which are not. Food technologists, who have been working on this problem, have gathered a substantial store of knowledge, based on test packs and commercial runs. This knowledge enables them to avoid major pitfalls, and to consistently produce quality products.

Variety of apples and degree of ripeness influence the flavor, the degree of acidity and the sugar content. Immature apples are apt to produce tartness, whereas fully ripened apples impart a greater degree of sweetness. In this connection, it is interesting that taste preferences may vary with geographi-



Chopping, Maceration, and Screening



Sorted apples are elevated to chopper (above), then are macerated and screened in comminutor (detailed below).

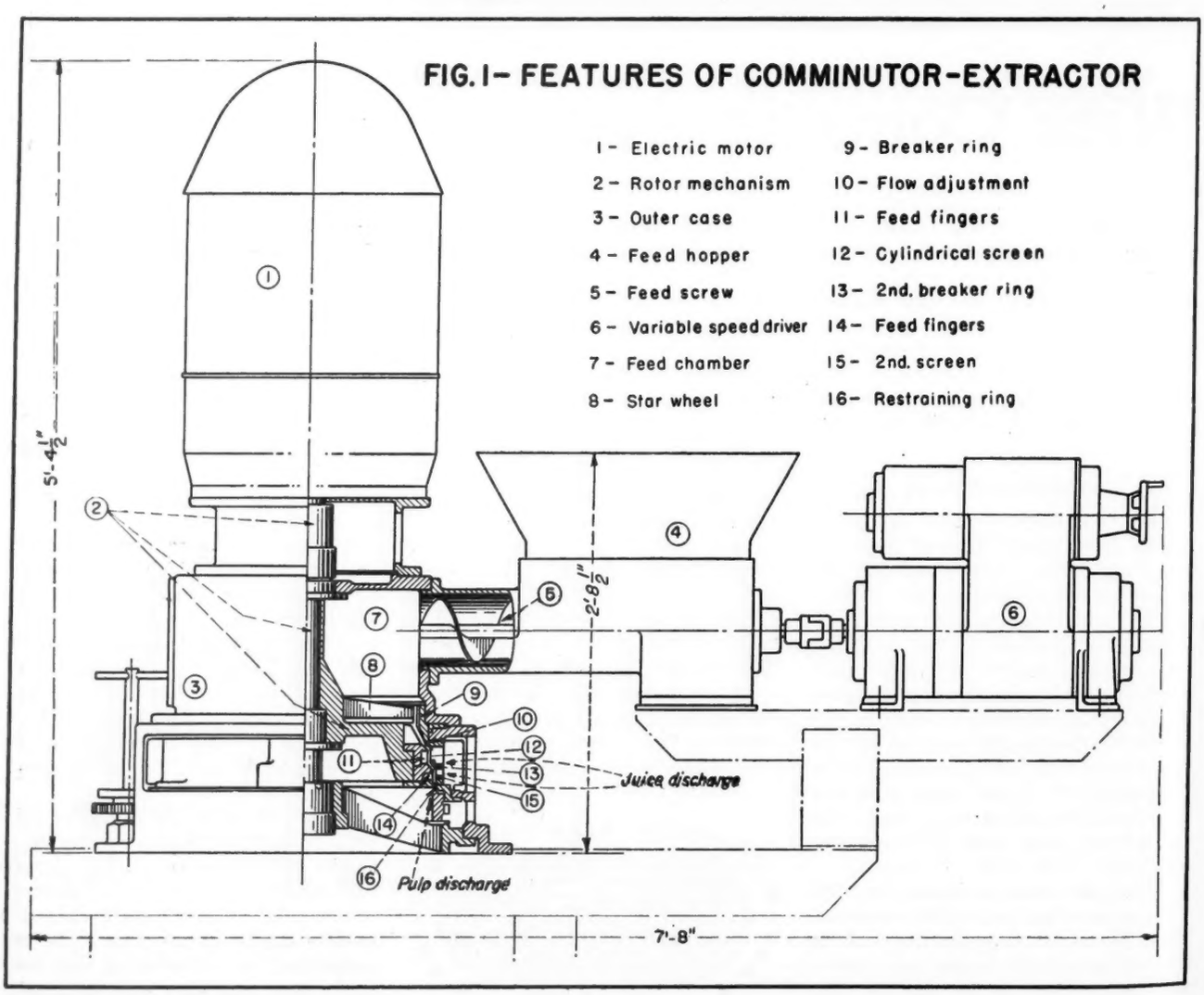
cal areas. For example, it is reported that New Yorkers prefer a juice with distinct tang to it. And a foreign taster advises that due to scarcity of sugar during the war, the British have developed a preference for foods with lower sugar content than is demanded by the American market.

Quality Fruit A Must

An important consideration with reference to comminuted apple juice is that it can be no better than the quality of the apples from which it is produced. All apples are inspected for defective materials, such as decay, worms, hollow core or other recognizable conditions, since these directly affect the color, the aroma or the flavor of the finished juice.

Use of Surplus Apples

Packing house culls having any of the above defects should be avoided for the making of comminuted apple juice. However, the process lends itself admirably to use of surplus apples or other apples which have been off-graded because of size, color or skin blemishes, but which otherwise are of high quality.



How Processing Line Makes Comminuted Apple Juice and Sauce

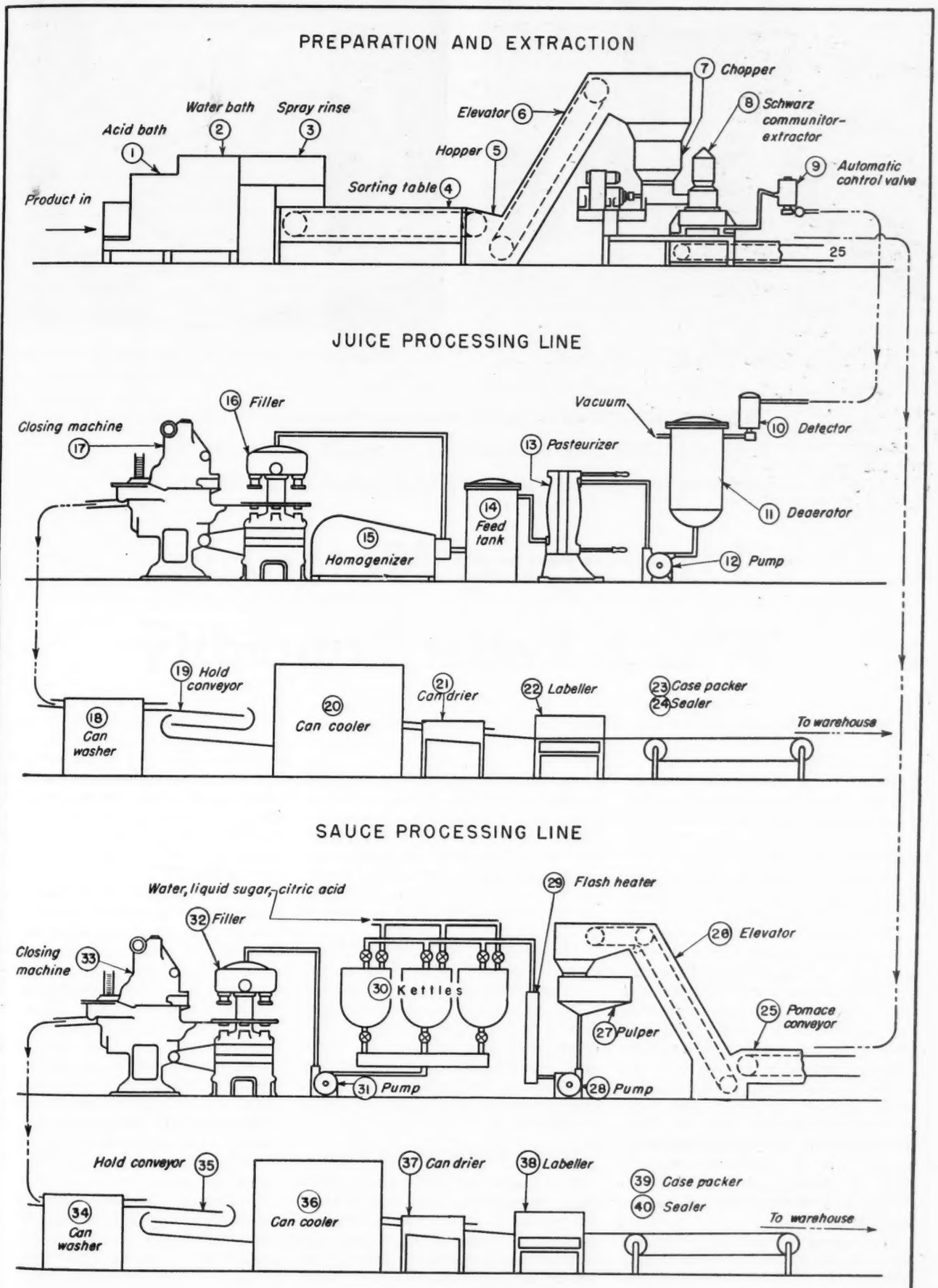
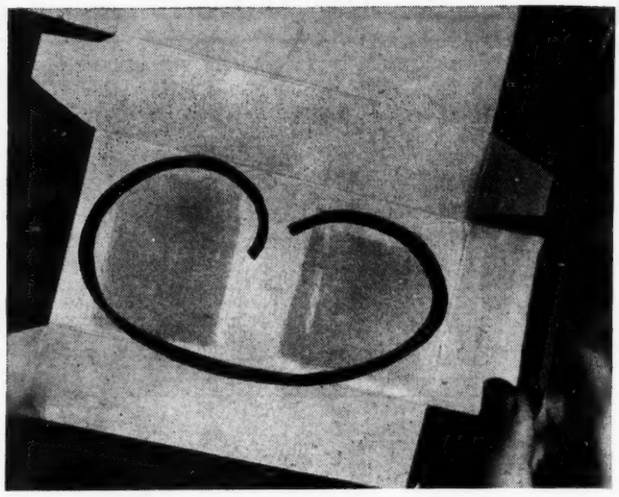


FIG. 2– STEPS IN PRODUCT MANUFACTURE

Will These Foods Pick Up Off-Flavors . . .



. . . When Their Fats Soak Into the Containers?

That has always been a risk with conventional wrappers. And shelf-life has suffered as a result. But now this problem is reported solved by new anti-oxidant-treated—

Packaging Materials Which Resist Rancidity

By G. T. CARLIN, Swift & Co., Research Laboratories, Chicago

RESULTS of studies by Swift & Co. Research Laboratories on use of antioxidants impregnated into cardboard and dispersed in the coating of cardboard and papers offer a solution to the troublesome and expensive problem of rancidity development in packaged fats and fat-containing foods.

The packaging materials studied include those commonly used in containers for lard, hydrogenated shortening, potato chips, cookies and prepared mixes containing flour and shortening. The anti-oxidants consist of citric acid, pyrogallol, galacetonin and gum guaiac.

The results have marked significance. Reason for this is that many divisions of the food industry have become heavily dependent upon paper products for the packaging of their numerous foods, and a goodly percentage of these foods are fats or contain fats and oils.

For reasons best known to itself, the paper container industry seems to have concentrated on the physical characteristics of packaging materials—such as carton strength, visibility, vapor transfer and economy—rather than upon their protective suitability for specific foods, particularly those of high-fat content. Although paper containers dominate the packaging of such important foods as potato chips, popcorn, cookies, salted nuts, crackers, pies, margarine, butter, shortening, meats, candies and prepared mixes, the problem of oxidative rancidity appears to have received little attention.

This apparent oversight is difficult to understand. Prolonged storage of fat-containing foods presents a serious problem to all who use paper packages during hot weather periods. Also, flavor problems originating from grease-soaked paper containers plague those who market cookies, potato chips, prepared mixes and the like during the summer months.

Blames Fat-Soaked Packages

Most paper bag and carton makers have attempted to greaseproof their products with coatings of one type or another. This practice falls short of a solution to the problem because of corner and fold fracture, cut edges which receive no coating, and failure of some of the glazes to prevent fat soakage.

Many food manufacturers and packers fail to understand that the paper container may be responsible for their rancidity problems. Instead, many processors may wrongly accuse the shortening manufacturer or fat refiner of failure to provide fats and oils of suitable keeping quality, when in truth packaging materials are the cause of their difficulties.

Cookie packages, which have been submitted for laboratory examination, showed that they had absorbed fat from the cookies. Consequently, they were responsible for the rancidity that developed within three days after the cookies were packaged. Numerous glassine bags for potato chips have been examined and found responsible for the development of rancidity within four days. Hundreds of samples of so-called rancid crackers have been found to be non-rancid, but contaminated with rancid odors originating in grease-soaked cardboard separators within the packages.

Shortening and margarine cartons and liners will produce "surface rancidity" whenever the fat soaks into either portion of the package. The shelf-life of many prepared mixes has been found to have been greatly reduced in the same manner.

These findings and observations give basis for the conclusions that paper

Comparative Test Data Show Efficacy of Anti-Oxidants

TABLE I—Effect of Paper-Board on Keeping Quality of Fats

Fats	Tests on Fats: Keeping Time by Active Oxygen Number of Fat (Swift Method)	Keeping Time in Glass Jars at 145 deg. F. (Schaal Test)	Keeping Time of Fat in Cardboard (1 g. Fat Dispersed in 5 g. of Cardboard) 145 deg. F. (Schaal Test)
Lard	3 hr.	7 day	< 1 day
Oleo oil	14 hr.	21 day	< 1 day
Hydrogenated shortening	90 hr.	35 day	< 2 day
Hydrogenated lard	45 hr.	18 day	< 1 day
Control	Cardboard without fat; no rancidity.		

TABLE II—Keeping Quality of Fats Dispersed in Cookies vs. Fats Dispersed in Paperboard

Fat	Keeping Time of Fat, Active Oxygen Method	Keeping Time of Cookies Incubated in Glass 145 deg. F.	Keeping Time of Cookies Incubated in Original Package—Cardboard Strip Inside Liner 145 deg. F.
Lard	3 hr.	32 days	4 days
Hydrogenated shortening	90 hr.	88 days	6 days
Oleo oil	14 hr.	44 days	2 days

TABLE III—Keeping Quality of Potato Chips Incubated in Various Packages

Container Type	Incubation Time Before Rancidity 145 deg. F.
Single wax glassine bag (a)	4 days
Single wax glassine bag (b)	7 days
Single wax glassine bag (c)	7 days
Duplex wax glassine bag	10 days
Duplex Diafane-cellulose with cellulose inner liner bag	7 days
Duplex Diafane-cellulose; Diafane on inside bag	14 days
Single wax glassine bag	3 days
Removed from single wax glassine bag (a), Incubated in sterile glass jars	14 days
Oil removed from frying kettle Incubated in sterile glass jars	15 days

TABLE IV—Keeping Quality of Prepared Mixes at 145 deg. F.

Type of Mix	How Incubated	Number of Days for Rancidity Development
Pie crust	Original carton; glassine bag liner	11
Pie crust	Repackaged in glass jars	25
Biscuit	Original carton	30
Biscuit	Repackaged in glass jars	42
Muffin	Original carton	14
Muffin	Repackaged in glass jars	31

TABLE V—Effect of Anti-Oxidants on Keeping Quality of Fat When Soaked in Cardboard

Cardboard Strips Impregnated With 1 g. Hydrogenated Shortening	Keeping Time Incubated at 145 deg. F.
Control (untreated)	2 days
Plus 2.5% citric acid solution	72 days
Plus 2.5% pyrogallol solution	Not rancid after 90 days
Plus 5.0% pyrogallol solution	90 days plus
Plus 2.5% galacetonin	90 days plus

TABLE VI—Keeping Quality of Lard in Parchment-Lined Paraffined Carton at Room Temperature

Cardboard Carton	Storage Time Before Evident Rancidity
Control (plain parchment liner)	30 days
Parchment liner with gum guaiac in sizing	180 days

packaging materials contain substances which seriously impair the keeping quality of fats. True, the soakage of fats into the paper packaging materials produces large surface areas for rapid oxidation, but this fact only partly explains the high rate at which the rancidity reaction progresses. There is justification for the conclusion that oxidation catalysts or "pro-oxidants" are present in the paper and that these agents likely account for the unusually high reaction rate.

Nature of Research

Studies in Swift & Co. research laboratories were systematically carried out to determine:

1. Effect of paper-board on the keeping quality of fats.
2. Keeping quality of fats when dispersed in cookies, compared with keeping quality of fats absorbed in paperboard.
3. Keeping quality of fats in potato chips held at elevated temperature in various containers.
4. Keeping quality of fats in prepared mixes held at elevated temperature in various containers.
5. Effect of anti-oxidants on keeping quality of fats absorbed into cardboard.
6. Keeping quality of lard held at room temperature in parchment-lined and paraffined cartons.

Findings summarized in Table I show the relative keeping quality of four types of fats when absorbed in cardboard and when packed in glass. Here, cardboard representative of the board used for packaging cookies was obtained from a biscuit manufacturer.

Despite the widely varying stability of the fats, the tests showed very little advantage of any particular type of fat over another after impregnation into paper-board. Although the high stability fats have advantages, it is apparent that these advantages are meaningless when the fats are absorbed into cardboard. A significant substantiation is the cookie-package rancidity experienced by the manufacturer at the time the board was obtained for examination.

Data in Table II were obtained by holding cookies, made from various fats, at 145 deg. F. until rancidity became determinable. The cookies were packaged in glass jars and in cellulose-wrapped cardboard cartons in direct contact with coated board of a type commonly used for the packaging of cookies. Fat from the cookies was easily absorbed through the cut edges of the cardboard. After two days at 145 deg. F., permeation of the fat from the cookies into the pulp portion of the board was evident. Results indicate little practical difference in the keeping time of the various fats when the cookies were held in their original container. On the other hand, those held in glass showed marked differences as well as much greater stability for each type of fat.

Results obtained by holding potato chips at 145 deg. F. in different types of bags, with control samples packaged in glass jars, are reported in Table III. The chips were fried in cottonseed salad oil, an oil of fairly good resistance to rancidity. The fact that there were widely varying differences in the keeping quality of the chips with respect to rancidity resistance is indicative that potato chip rancidity is not always directly traceable to the frying fat. All of the bags used in the test were claimed by their manufacturers to be "greaseproof."

Data given in Table IV cover prepared mixes held at 145 deg. F. in original cartons and repackaged in glass jars. All samples contained lard as the shortening. In the case of the pie mix, fat soakage into the carton became apparent quickly and with rapid development of rancidity.

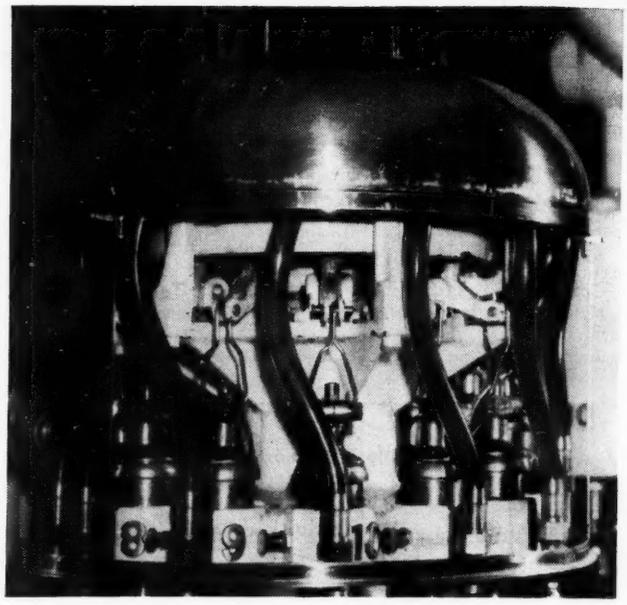
Role of Anti-Oxidants

The effects of impregnating cardboard strips with various anti-oxidants prior to their contact with fats and holding at 145 deg. F. is given in Table V. Since the keeping quality of the fat absorbed in the cardboards was greatly increased by the use of four different anti-oxidants in these tests, commercial application of the treatment can be recommended to overcome rapid rancidity development as a result of fat absorption into packaging materials.

What to do about the creeping of fats into the folds of parchment-lined car-

(*Continued on page* 218)

This siruper in beverage plant and also pipe lines supplying it are kept filled with quaternary solution over nights and weekends—sanitizing the equipment against yeast-type spoilage. This is one of the applications based on tests proving—



Quaternaries Kill Yeasts Found in Carbonated Beverages

By SAMUEL S. EPSTEIN, Vice-President and Chemist
Kirsch's Beverages, Inc., Brooklyn, N. Y.

SURFACE-ACTIVE agents—particularly the quaternary ammonium compounds recommended for many food plant sanitization purposes—have a definite sanitizing value in the carbonated beverage plant. The successful application is for control of contaminating yeasts and torulae.

Previous investigations[1, 2, 3, 4, 5, 6] have stimulated interest in certain of these agents as a replacement for chlorine in the sanitization and sterilization of plant equipment.

Unlike chlorine, solutions of surface-active compounds have no corrosive action on metals, impart no undesirable tastes or odors, and are not toxic in concentrations recommended. Sterilizing and germicidal properties reportedly compare favorably with those of chlorine under certain conditions.[7, 8]

In order to evaluate the effectiveness of surface-active compounds for beverage plants, studies were made of two of these—alkyl-dimethyl-benzyl-ammonium chloride* and Nacconol.**

Literature cited and other studies on surface-active compounds, including quaternaries, relative to sanitization and sterilization were confined to bacteria of significance to public health or to the dairy industry.

Yeast and torulae were chosen as test microorganisms because they are the major agents of microbial spoilage of carbonated beverages. It may be added, that "wild" yeasts and torulae are undesirable contaminants of beer and ale. For this reason it is felt that the present reported investigation extends our knowledge of useful properties of these surface-active compounds. It is hoped that our efforts will stimulate sufficient interest among other researchers to pursue similar studies to judge our findings.

In our investigations, studies were made on the destructive powers of alkyl-dimethyl-benzyl-ammonium chloride and Nacconol upon yeasts, and particularly upon non-cultured yeasts originating from returned beverage bottles and growing readily in bottled carbonated beverages.

In the study of laboratory cultures of brewers yeast *Saccharomyces cervisiae*, "wild" yeast *Saccharomyces pastorianus*, and false yeast *Torula utilis*, our results showed that the concentration required for complete killing within 10 min. at 68 deg. F. were, respectively, 1-4,000, 1-2,000 and 1-5,000 of the alkyl-dimethyl-benzyl-ammonium chloride compound. However, a concentration of 1-7,000 effected complete sterilization in 4 hr.

Neither of the true yeasts was killed within 10 min. by Nacconol at the high dilution of 1-500. The *Torula* species succumbed within 10 min., but survived for 5 min. in a 1-750 dilution at 68 deg. F. Results and conditions of the tests are shown in Table I.

Over a period of several months, a test schedule, totaling nine tests, was made on the sterilizing powers of alkyl-dimethyl-benzyl-ammonium chloride and Nacconol upon composite yeast growths developed in acid and non-acid carbonated beverages. The greater number of tests were made with Roccal alone. In other tests, Zephiran and Turgicide were used. Observed results indicated no difference of sterilizing powers of these three commercial compounds.

Beverages Used in Tests

The test microorganisms employed in each of the studies herein reported were developed in various flavored carbonated beverages. Bottles coming into the plant from the trade were selected for intensity of internal uncleanliness. Each of the bottles was rinsed once with tap water, then chilled in ice water. Similar sized bottles containing flavored beverages were likewise chilled and the beverage from each was transferred into a non-sterile bottle. The bottles were then sealed with crowns by means of a hand crowner.

In this manner, four sets of unclean bottles (three to a set) were filled

* Some market products appear under the names of Roccal, Zephiran, Turgicide and B.T.C.
** Sodium alkyl aryl sulphate.

with each of four differently flavored carbonated beverages. The twelve bottles were then incubated at 80 deg F. and observed daily for growth for 7 to 14 days. Upon evidence of growth, a bottle was removed from the incubator and allowed to rest at room temperature, 60 to 75 deg F.

Ginger ale, fruit, cream and root beer flavors were used as substrates for the development of the test microbes. The chemical analyses of these flavors with respect to sugar content, gas volume, acidity and pH were:

	% Sugar	% Acid as Citric	pH After Decarbonation	Volumes of CO_2 Gas
Ginger Ale	7.4	0.105	2.65	3.1–3.3
Fruit	12.0	0.123	2.95	2.5–2.8
Cream	10.2	0.004	6.10	2.7–2.9
Root Beer	10.0	0.021	5.40	2.4–2.6

Potential Contamination

After 14 days, the contents of each of the twelve bottles showed evidence of heavy microbial growth. Flaky and powdery deposits were noted in most of the bottles. Cloudiness was slight in the acid beverages but pronounced in the non-acid ones. Microscopic examinations of upper portions and sediments disclosed that in ten of the twelve bottles there was a profuse growth of both true yeasts and torulae exclusive of bacteria. This observation was later confirmed by yeast sporulation tests on gypsum blocks. The formation of endospores within seven days at room temperature was considered indicative of true yeasts.

Contents of each yeast-contaminated beverage bottle were carefully decanted, and 5 ml. of the sediment removed by means of a pipette into a sterile, glass-stoppered bottle containing 5 g. of sterile ground quartz. Then 50 ml. of sterile water was added to the composite of 50 ml. of yeast suspension. After thorough shaking, the glass stoppered bottle was set down for about one minute to permit the deposition of the quartz. This suspension of yeast growth and suspensions of similar composites were used as cultures in the sterilization tests.

Laboratory Procedure

For the tests, 1 ml. of composite growth was pipetted into 1x6 in. test tubes. Then 8 ml. of sterile tap water was introduced. Each tube was shaken to mix the contents and then placed in a rack in a water bath maintained at 68 deg. F. Solutions of the test reagents were previously prepared so that the addition of 1 ml. to the 9 ml. in a tube would give the desired concentration of the test under investigation.

The 1 ml. of test reagent was added to a tube when the contents in the tube registered the test temperature. Upon the addition of the reagent solution, the tube was shaken to mix the contents thoroughly, and immediately placed back in the rack. The test temperature was maintained within a degree up to 30 min. Thereafter, no attempt was made to control the temperature.

At the end of the desired time in-

Laboratory Cultures Indicate Sanitizing Ability

Table I—Sterilizing Action of Alkyl-Dimethyl-Benzyl-Ammonium Chloride and Nacconol Against Laboratory Cultures of Yeasts Grown on Malt Extract Agar Slants at 80 deg. F.

Inoculum:—*Saccharomyces cerevisiae* ..... 6,000,000 per ml.
Saccharomyces pastorianus ..... 5,500,000 per ml.
Torula utilis ..... 10,000,000 per ml.
Temperature of test:—68 deg. F.
Transplants:—0.1 ml. of fungicide-yeast mixture into 20 ml. of sterile malt extract brotn followed by incubation at 80 deg. F. for 7 days.

DILUTION		*Sach. cerevisiae* 5 Min.	*Sach. cerevisiae* 10 Min.	*Sach. pastorianus* 5 Min.	*Sach. pastorianus* 10 Min.	*Torula utilis* 5 Min.	*Torula utilis* 10 Min.
ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE	1–1,000	0	0	0	0	0	0
	1–2,000	0	0	0	0	0	0
	1–3,000	0	0	+	+	0	0
	1–4,000	0	0	+	+	0	0
	1–5,000	+	+	+	+	0	0
	1–6,000	+	+	+	+	+	+
	1–7,000	—	—	—	—	—	—
NACCONOL	1–500	+	+	+	+	0	0
	1–750	+	+	+	+	+	0
	1–1,000	+	+	+	+	+	+

+—Growth 0—No growth.

Tests on Yeasts Growing in Beverages Confirm Preliminary Findings

Table II—Sterilizing Activity of Surface Active Compounds on Composite Yeast Growths Developed in Carbonated Beverages

Test No.;	Test Reagent	Dilution	Plate Count* Initial No. of Yeasts Exposed	Plate Count*—Number Surviving After 5 Min.	10 Min.	30 Min.	1 Hr.	2 Hrs.	4 Hrs.	24 Hrs.
1.	Control	———	120,000	———	———	———	———	———	———	>100,000
	A	1–6,600	120,000	———	———	———	———	———	———	27
	A	1–3,300	120,000	———	———	———	———	———	———	0
	N	1–6,600	120,000	———	———	———	———	———	———	43
2.	Control	———	150,000	———	———	———	———	114,000	———	———
	A	1–6,600	150,000	———	———	———	———	30	0	———
	N	1–5,000	150,000	———	———	———	———	100	10	———
3.	Control	———	175,000	———	———	———	———	210,000	218,000	190,000
	A	1–6,600	175,000	———	———	———	———	100	0	0
	N	1–5,000	175,000	———	———	———	———	200	10	4
4.	Control	———	50,000,000	———	———	———	———	———	———	36,000,000
	A	1–6,600	50,000,000	———	>5,000	>5,000	1,200	———	540	———
	N	1–5,000	50,000,000	———	>5,000	>5,000	>5,000	———	1,020	———
5.	Control	———	58,000,000	———	———	54,000,000	63,000,000	———	———	51,000,000
	A	1–5,000	58,000,000	———	160,000	10,200	31,500	———	———	30,000
	A	1–3,000	58,000,000	———	3,400	40	0	———	———	0
	N	1–3,000	58,000,000	———	584,000	31,000	26,000	———	———	380
	N	1–1,000	58,000,000	———	252,000	19,000	6,400	———	———	0
6.	Control	———	20,000,000	———	———	———	18,000,000	———	———	———
	A	1–2,500	20,000,000	38	0	———	0	———	———	———
	A	1–2,000	20,000,000	0	0	———	0	———	———	———
	N	1– 750	20,000,000	1,100	1,300	———	30	———	———	———
	N	1– 500	20,000,000	1,400	810	———	0	———	———	———
7.	Control	———	38,000,000	———	———	———	36,000,000			
	A	1–2,000	38,000,000	0	0	———	———			
	A	1–1,000	38,000,000	0	0	———	———			
	N	1– 750	38,000,000	500	280	———	———			
	N	1– 500	38,000,000	180	540	———	———			
8.	Control	———	40,000,000	———	———	———	42,000,000			
	A	1–2,000	40,000,000	24	0	———	———			
	A	1–1,000	40,000,000	0	0	———	———			
9.	Control	———	10,000,000	———	———	———	12,000,000			
	A	1–2,000	10,000,000	0	0	———				
	A	1–1,000	10,000,000	0	0	———				

A—Alkyl-dimethyl-benzyl-ammonium chloride N—Nacconol *—Colony counts per milliliter.

terval, 0.1 ml. of the mixture was withdrawn from a tube and immediately introduced into a test tube containing 15 ml. of sterile molten malt extract agar medium (109-113 deg. F.). The tube was then rolled between the palms of hands to assure thorough and uniform mixing of the subculture material. After flaming the mouth of the tube, the contents were poured into a sterile petri dish. Upon solidification of the agar medium, the plates were inverted and incubated at 86 deg. F. for four days.

The substitution of molten agar for broth, and the increased quantity of subculture, is essentially the Cade-Halverson plate count technic.[9] The objectives of this procedure are: To overcome the killing action which may continue in the broth tubes during incubation, and to lessen the "error of random sampling" by increasing the quantity of sample tested at one time. It is also obvious that the plate count method gives information as to the degree of killing when the sample inoculated into a medium is not sterile. Another possible advantage is the antidotal effect of agar upon bacteriostatic and fungistatic activity of chemical reagents.

Tests Results

Results of the first test, as well as those of the other eight tests, are shown in Table II. When the number of yeast cells exposed were less than 200,000 per ml., as in the first three tests, it was found that alkyl-dimethyl-benzyl-ammonium chloride, in a dilution of 1-6,600, and Nacconol, in a dilution of 1-5,000, exerted definite fungicidal powers. However, complete sterilization was not accomplished within two hours.

In the succeeding experiments, the yeast inoculum was increased in excess of several million per ml. As anticipated, the sterilizing activity of the reagents was lessened. In later tests (Nos. 6, 7, 8 and 9) the concentrations of the quaternary ammonium compounds tested were increased to 1 to 2,500 and 1 to 1,000. The concentrations of Nacconol were increased to 1 to 750 and 1 to 500.

In three of four tests, exposure of yeast cells to dilutions of 1 to 2,000 resulted in complete sterilization within 5 min. In all four of these same tests complete destruction of exposed yeast cells occurred within 10 min. In all three tests with the 1-1,000 dilution, complete sterilization was accomplished within 5 min. Nacconol in a concentration of 1-500 failed to affect complete sterilization within 10 min.

In the test procedure employed, wherein 0.1 ml. of yeast suspension-reagent mixture is plated with 15 ml. of molten agar medium, the final dilution of the reagent is increased 150-fold. Thus, the subculture of a test dilution of 1-1,000 of quaternary ammonium compound contains the active ingredients at a dilution of 1-150,000. The reliability of test results are then predicated on the theory that such dilutions of the active ingredients under study are devoid of fungistatic activity in malt extract agar medium.

Fungistatic Activity

In conjunction with the fourth test, a supplementary study was made to determine the fungistatic activity of alkyl-dimethyl-benzyl-ammonium chloride. Various solutions of the compound were prepared so that the addition of 1 ml. to 8 ml. of molten malt extract agar gave the desired final concentration in a culture plate consisting of 9 ml. of treated agar medium and 1 ml. of diluted suspension of carbonated beverage yeasts growth.

Plates in duplicate were incubated at 86 deg. F. Results are recorded in Table III. It will be noted that the quaternary compound in dilutions of 1-80,000 and higher is entirely devoid of fungistatic activity, thereby confirming the validity of the test procedures employed. Differences in individual colony counts on agar plates containing no fungicide, or very low concentrations of fungicide, were well within the range of discrepancies normal to variations encountered in sampling yeast suspensions.

It is interesting to note the definite fungistatic activity of alkyl-dimethyl-benzyl-ammonium chloride in dilutions of 1-40,000 and higher. Fungistatic activity is more pronounced when the numbers of yeast cells are relatively few. It may also indicate delayed killing activity, since the presence of unusually resistant cells may geometrically decrease in proportion to arithmetic numbers decreasing.

In most instances of sterilization studies, it is observed that the time required to destroy 99 percent of test microorganisms is usually a relatively short part of the total period required to accomplish complete sterilization. The greater portion of time is consumed for the destruction of especially resistant cells.

Practical Applications

Our investigations indicate that Nacconol cannot be considered for practical plant sanitation where yeast contamination is a major object of elimination. The fungicidal or yeast killing powers of Nacconol observed is in agreement with the findings of Fleet[10], who reported that Nacconol diluted 1-1,000 did not retard fermentation by brewers yeast in Smith laboratory test tubes.

Our studies did demonstrate that a reliable commercial preparation of alkyl-dimethyl-benzyl-ammonium chloride can well replace chlorine solutions in some phases of plant sanitation. In our own practice, we have used such an agent for the sanitary maintenance of pipe lines and sirupers overnight and over week-ends. At first we used a 10 percent solution at the rate of 1 oz. of solution to 2 gal. of water. Later we were well satisfied with the use of 1 oz. of solution to 4 gal. of water. This gives a final concentration of the active ingredients of 1 to 5,120, or approximately 200 ppm.

It is emphatically stressed that the same precautions employed in chlorine sterilization must be adhered to in using alkyl-dimethyl-benzyl-ammonium chloride. Equipment must be thoroughly pre-cleaned, and thorough rinsing must follow the contact period. The presence of organic matter will definitely decrease the sterilizing efficiency, thus the importance of primary mechanical cleanliness is obvious.

It is also important to note that the sterilizing powers of quaternaries are greater in the alkaline range of pH reaction. The enhancement of sterilizing activity at pH 10 is slight, however, when compared to increase in sterilizing powers of chlorine solutions in the acid range of pH 6. Where waters are definitely acid, it would be advisable to add small quantities of appropriate chemical solutions to make such water slightly alkaline.

There has been some question as to the efficiency of sterilizing powers of quaternaries in the presence of calcium compounds and in hard water. On this question, Ridenour and Armbruster[11] very recently reported that a

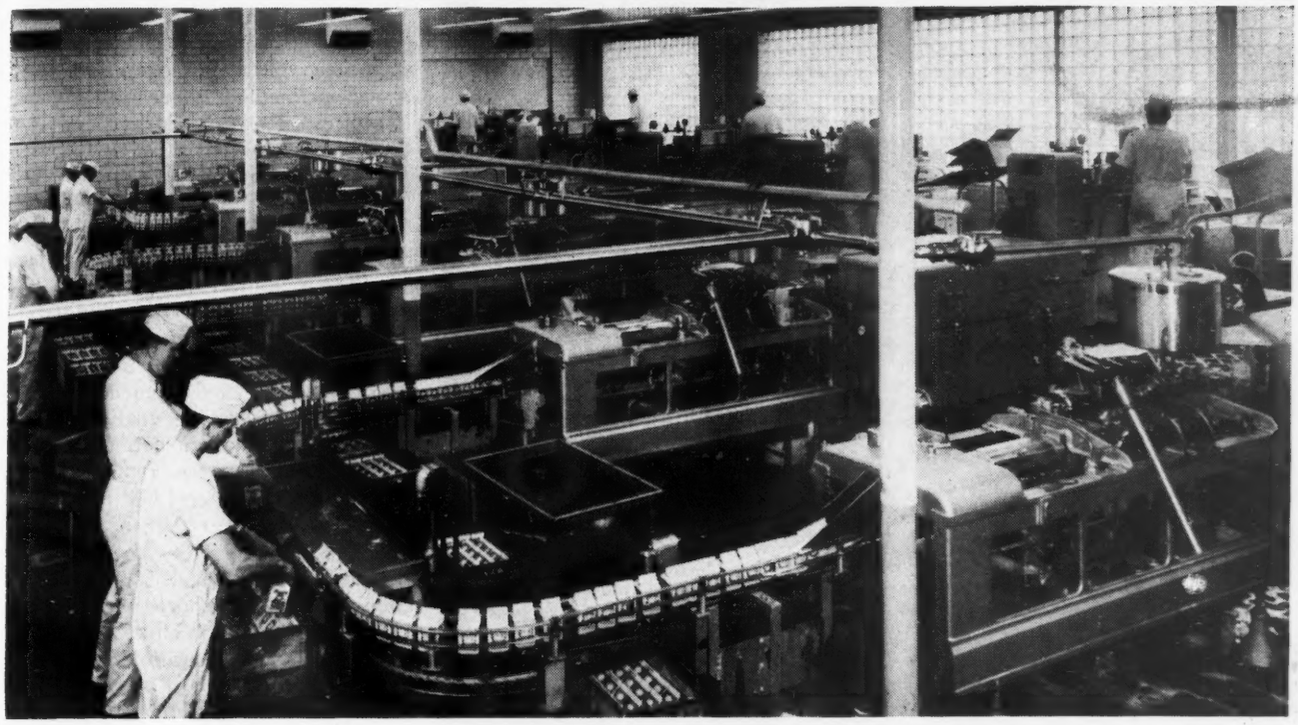
(*Continued on page 220*)

Range of Effectiveness Is Revealed by Plate Counts

TABLE III—YEAST GROWTH on Malt Extract Agar Containing Various Concentrations of Alkyl-Dimethyl-Benzyl-Ammonium Chloride

Concentration	Individual Plate Counts on Dilute Yeast Suspensions		
	Suspension No. 1	Suspension No. 2	Suspension No. 3
None	153—138	15—11	5—3
1- 10,000	0—0	0—0	0—0
1- 20,000	48—27	4—0	0—0
1- 40,000	113—81	8—6	0—0
1- 80,000	148—126	14—10	5—2
1-100,000	158—139	13—11	4—3

A SPECIAL FOOD INDUSTRIES REPORT . . .



The Dairy Industry Makes Significant Advances

By G. H. WILSTER, Professor of Dairy Manufacturing, Oregon State College, Corvallis Ore.

SO many advances have been made in the field of dairy manufacturing and dairy technology during the war years and the three years since V-J day that one hesitates to single out any one development that has been the most important. Each progressive step has come about through the combined efforts of the chemist, the physicist, the engineer, the bacteriologist, the nutritionist and the dairy technologist.

Vying in importance are new processing technics, new labor saving equipment and improvements in methods of distribution. All of these tend to bring about improved product quality and to reduce operating costs.

Processing Progress

An outstanding contribution toward more efficient milk plant operation was made in 1945, when a method was developed for increasing enormously the capacity of an homogenizer. The dairy plant in which this method was evolved had experienced difficulty, in common with many others, in synchronizing the fixed capacity of an homogenizer into an otherwise flexible capacity milk production line for continuous pasteurization and bottling.

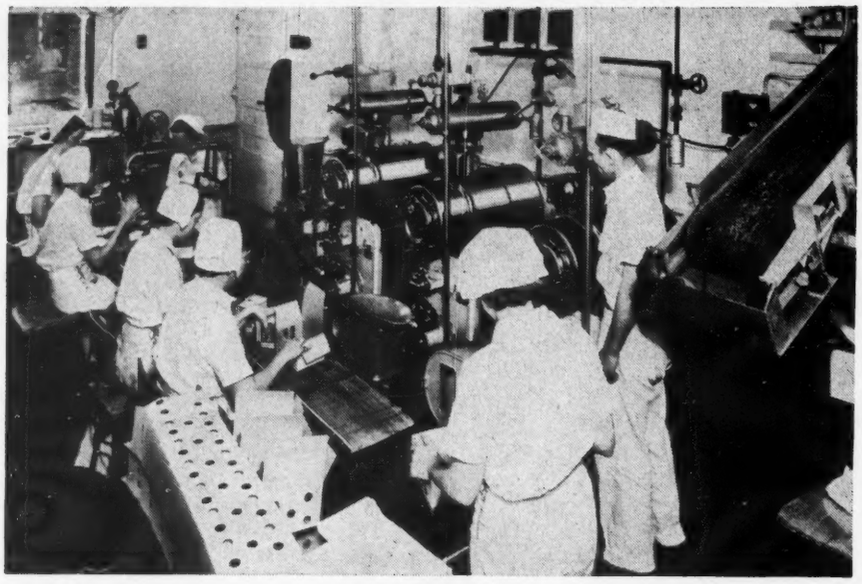
This problem was solved by inserting a separator in place of the milk clarifier, so that only that part of the product leaving the cream outlet of the separator would pass through the homogenizer. This "cream" was reunited with the portion of the milk from the skim milk outlet of the separator just prior to passage through the final heating section of the high-temperature short-time pasteurizer.

The cream control valve was removed from the separator to allow the homogenizer to draw its full capacity (4,300 lb. per hr.) in order to avoid air incorporation. Fat content of the "cream" going to the homogenizer ranged from 9 to 12 percent, while that of the skim milk ranged from 0.01 to 0.02 percent. Homogenizing pressure of 3,000 psi. was used for the highest efficiency. The complete unit was operated at a rate as high as 16,000 lb. per hr. The homogenized milk was satisfactory, as judged by top and bottom fat test differentials, curd tension, microscopic appearance and sedimentation due to leucocytes.

Aeration control is important in the preservation of vitamin C as well as for limitation of off-flavors. This is

Higher-quality products are turned out more efficiently and at lower cost by today's enterprising dairyman—because he has been quick to adopt improved technics, better controls, and newer equipment.

- **Question for dairymen readers: "Has your operation kept abreast of these progressive developments?"**
- **Query for other food plant operators: "Which of these proven practices can you profitably apply?"**



Yesterday . . .

Seven operators were needed to fill pint packages of ice cream at rate of 1,440 per hr.

. . . And Today

Four operators, with the aid of automatic packaging machinery, fill 3,600 pints per hr.

accomplished in recently patented apparatus by deaerating milk prior to bottling under air-free conditions. The milk is sprayed at a temperature of 105 to 115 deg. F., into a vacuum chamber where an amount of water is evaporated equal to about 0.5 to 2 percent of the weight of the milk. The temperature is reduced 7 to 15 deg. The deaerated milk is removed continuously from the bottom of the chamber, then cooled and packaged under subatmospheric pressure.[1]

Methods of sterilizing milk other than by heat are being investigated at the present time. In one of these, a $\frac{1}{32}$-in.-thick film of milk is exposed to the rays produced by germicidal lamps. The milk flows over a series of slowly revolving stainless steel cylinders arranged in pairs one above the other. Lamps are attached to sliding racks between each bank of cylinders. These racks slide out for cleaning. Flavor of the milk was found to be excellent. The equipment is suitable for farm use as well as for milk plants.[2]

Another method, developed by German scientists, exposes the milk in quartz tubes to irradiation by twelve mercury vapor lamps. Effective penetration of the rays is restricted to about 1 mm. The optimum wave length for bacterial treatment was given as 2537 Angström units.[3]

Recent progress on continuous butter manufacturing processes indicates that the orthodox method of churning cream and salting and working butter is on the way out. At this writing the continuous processes are in the pilot stage in the U. S.

Within a short time, however, several "experimental" commercial installations will be in operation. The American methods, developed by The Creamery Package Mfg. Co. and Cherry-Burrell Corp., as well as the Australian "New Way", the German "Fritz" and "Alfa", the Swedish "Alfa-Laval", and the Swiss "Senn" have been fully described.[4,5,6] The "butter plant of tomorrow" promises: (1) Complete sanitation by the elimination of manual handling of the butter and exposure to air; (2) less moisture loss during printing and from cut prints; (3) improved keeping quality of butter; (4) easier composition control; (5) less floor space required; (6) fewer man-hours per 1,000 lb. of butter, and (7) lower cost of manufacture.

Another continuous process—the high-temperature short-time pasteurization of ice cream mix, which was proved satisfactory several years ago—has now been approved by at least two state regulatory departments.

Ion exchange, now finding application in many industries, has been employed in the preparation of soft curd milk. The principle has also been used in the manufacture of ice cream, dry whole milk, condensed milk and other specialized products.[7] It is reported that the method is effective in conferring greater heat stability to evaporated milk.[8]

In the Cheese Field

Developments in cheese production have been numerous. All milk used for cottage and cream cheese is now pasteurized, as is also a large percentage of that used in making Cheddar cheese. Research is under way to determine if it will be possible to make Swiss, Limburger, blue-mold, and other varieties of cheese from pasteurized milk. One large organization has reported that it is successfully manufacturing Camembert, Limburger, and other varieties from pasteurized milk.[9]

Manufacturing cottage cheese from non-fat dry milk solids by a new short method was announced a few months ago. It calls for the use of 20 lb. solids to each 80 lb. water, to give a product of 20 percent concentration, or about $2\frac{1}{2}$ times the concentration of ordinary fluid skim milk. To this reconstituted milk is added 12 percent starter and 12 c.c. of a coagulator.

The time required for setting until cutting the coagulum into cubes with wire knives is about three hours. The balance of the process is in accordance with the established practices.[10]

A method has been developed for

making grating cheese that has a high piquant flavor. In this method, the cream is homogenized before it is added to the raw skim milk. This promotes the development of fatty acid that confers a characteristic flavor during a shorter ripening period than was formerly used.[11]

Cheese Whey

In the manufacture of cheese, about one-half of the milk solids remain in the whey. This whey, when dry, may be used for a variety of foods such as cheese spreads, bakery products, infant foods, soups and candy. It may be used for industrial and pharmaceutical products such as penicillin, vinegar, plastics, riboflavin concentrate and protein hydrolysate.

Cheese whey may also be used for the production of ethyl alcohol, using a yeast *Torula cremoris* to ferment the milk sugar.[12] A yield of alcohol averaging 90.73 percent in the laboratory and as low as 84 percent under pilot plant operation was reported.

Recent research on the use of high-quality spray-process dry whey solids in ice cream has shown that up to 7 percent of the product could be used in vanilla ice cream and as much as 10 percent could be used in chocolate and strawberry ice cream.[13]

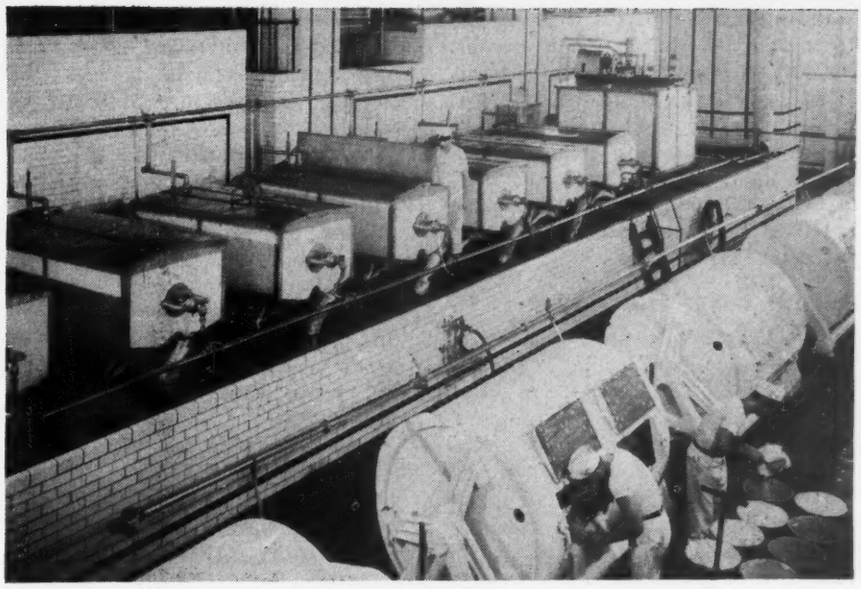
Dry Milk Products

Enormous improvements were made in the production and quality of dried milk products during the war, and research in progress in different laboratories at the war's end was concerned with methods of improving storage properties and reconstitutability of these products.

In the opinion of Col. R. A. Isker, former director QMC Subsistence Research & Development Laboratory, the manufacture of dry ice cream mix in large quantities for use by the armed forces, was the greatest single achievement of the American dairy industry during World War II.

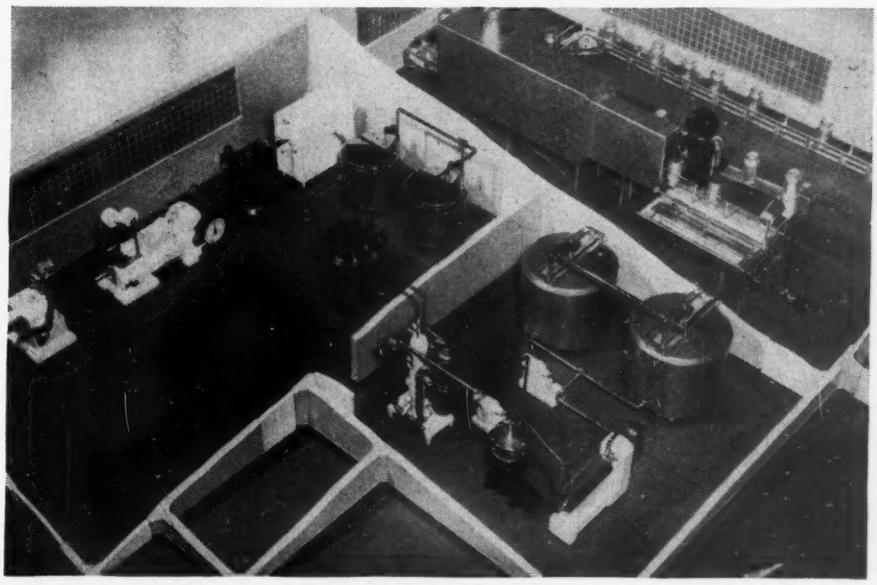
As far as dry whole milk is concerned, we advanced further industrially in the four war years than we had in the previous 10 to 15 years, because the industry accepted the results from basic research and put them into practice.

Several methods of preparing dry milk-fat have recently been developed. One commercial process, protected by a patent,[14] involves pasteurizing fresh, sweet cream at 170 to 180 deg. F., then centrifugally separating this to obtain a high testing product containing 80 percent fat, followed by homogenizing and passing the product through a settling tank. The fat when decanted contains about 2 percent moisture and is freed from this moisture by passing through a centrifugal separator. If of high quality, dry milk fat will show little change when stored at 40 deg. F. for 6 months.



Today . . .

Cream is churned in batches. Butter is removed from churns by hand and packed in tubs.



. . . And Tomorrow?

In Cherry-Burrell process, cream is converted to butter, worked, packaged continuously.

New Equipment

The equipment developed since the war has been noteworthy for the emphasis placed on sanitary and labor saving features. These design considerations have overshadowed efforts to use new principles of operation. On the score of sanitary features, the trend is toward universal use of stainless steel, in place of tinned copper. Likewise, great attention has been paid to sanitary construction which facilitates cleaning and inspection.

Labor saving is the main advantage of the new ice cream packaging units which have been developed during the last two years. Two of these—namely, the Pure-Pak and Anderson machines—accomplish the entire carton forming, filling and closing operations with one unit. Others—such as the Ray and General Mills—consist of several units which, when integrated into one, perform the entire operation automatically. Capacities up to 85 pint packages per minute, filled in one, two or three flavors directly from continuous freezers, are obtained. One operator is required to keep the feed magazine filled with flat cartons and to adjust and otherwise supervise the unit.

A new type heat exchanger known as a Mallorizer was offered to the dairy industry a short time ago. It is equipped with a small diameter internal tube through which the milk product to be treated flows at a relatively high velocity and turbulence. The overall

heat transfer is reported to be in the order of 1,200 Btu. per sq. ft. per hr. per deg. F. log mean temperature difference. With this equipment it is possible to produce sterile milk or cream which, when placed in a container, will keep without refrigeration for ten days to two weeks with no greater change in flavor than that occuring due to the pasteurizing of good raw milk.[15]

Another Fast Heater

The Vacreator vacuum pasteurizer may be used for instantly heating cheese milk, cream for butter making, ice cream mix and market cream, employing steam to a temperature of 190 to 200 deg. F. followed by a treatment in two vacuum chambers maintained at about 20 and 28 in. vacuum, respectively.[16] When used for cheese, the milk is first preheated to at least 145 deg. F., then there follows treatment at a temperature of 165 to 175 deg. F. Since the milk emerges from the third chamber of the Vacreator at a temperature of about 100 deg. F., it needs to be cooled only 15 deg. to the setting temperature.

Improvements have been made in the construction and operation of vats for heating milk and cream. Among these are: Use of water at a controlled temperature, sprayed on the outside of the lining in a fast, continuous stream as a heating medium; and elimination of insanitary stuffing boxes. These vats are equipped with stainless steel agitators for adequate stirring of the product during heating.

This same heating principle is applied to a new type of cheese vat. It is superior to either direct steam or hot water used in the jacket, since there are no hot spots causing uneven firming of the curd.

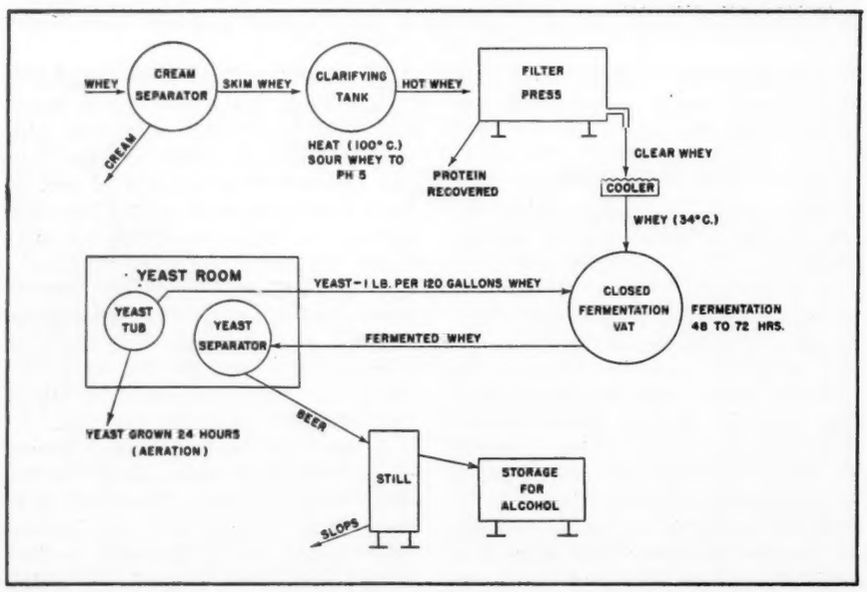
An ingenious method for heating water for various purposes in a cheese factory by the use of electricity has been used in Switzerland since 1945. The patented system is known as the "Magro." Temperature of water in two boilers, with a capacity of 900 gal., is automatically maintained at 244 to 248 deg. F. This water is used for heating milk, whey, curd, and the curing cellar, and for cleaning the equipment.

The all-metal cast aluminum alloy churn, which was developed several years before the war, has been improved considerably during the last three years. Since this churn meets modern ideas of sanitation, mention of the improvements is justified. The castings which make up the barrel are now welded, thus making the churn a one-piece unit with a smooth interior.

The drive is located in a water-proof compartment and is of the noiseless, roller-chain type. By means of a variable speed control, the speed of the standard size churn barrel may be varied from 23 to 36 rpm. The new churn is equipped with an ingenious safety switch lock. The key from this switch lock must be inserted in the churn door before it can be opened. Thus it is impossible to start the churn with the door open.

A spray milk drier, in which the milk is dried in an inert gas such as nitrogen or carbon dioxide, has proved satisfactory for laboratory purposes. Exhaust gas from the drier is dehumidified and reused. This is accomplished by cooling with not more than 20 gal. of 50 deg. F. water per lb. of water removed.[17]

Equipment for heating ice cream mix continuously to a high temperature without "burn-on" is now on the market. A Ste-Vac heater, for example, if properly installed and operated, will heat fluid products to 190 deg. F. in a one-stage operation, and to as high as 240 deg. F. in a two-stage operation. Concentrated products may be heated from 40 deg. F. or less to as high as 190 deg. in a two-stage operation without burn-on taking place.



CHEESE WHEY may be fermented to ethyl alcohol by means of a yeast (Torula cremoris).

Control Equipment

With the wider adoption of automatic, continuous processing of milk, improved control devices are needed. Two types of floatless liquid level controls are now on the market. One is based on the use of a highly sensitive electronic tube in conjunction with a relay. Another is based on an induction type relay. The controls prevent waste, save labor, and increase the efficiency of the milk plant.

The flow-diversion valve, which is an integral part of a high-temperature short-time pasteurizer, and is required on the 160 deg. F. 15 sec. continuous pasteurizers, has been simplified and improved. All parts of the new valve that come in contact with milk are 18-8 stainless steel. The valve has been made practically foolproof in its operation by means of improvements in design of the solenoid valve and interlocking micro-switch. There is no possibility of obtaining forward flow of sub-legal temperature milk; if air or power fails, milk is automatically diverted for re-heating. Micro-switch, solenoid valve, and diaphragm motor are completely enclosed.

A new control system for high-temperature short-time pasteurizers is now available. Heretofore, the instruments used to control a short-time pasteurizer consisted of separate units. These now have been combined in one unit. In addition, there have been a number of major refinements designed to provide the user with a simpler and more reliable controller system.

The improved controller combines safety thermal limit recorder, water temperature indicating control, and cold milk record. The frequency pen in the safety thermal limit controller can now be depended upon to give a better written record, since the pen is moved more slowly by a small electric motor. Also the speed of response of the thermal element in this instrument has been decreased to 2½ sec.

Improved thermometers for use in vats, milk lines and storage tanks are now available. They are constructed with 3A sanitary 18-8 fittings. The thermometers are hermetically sealed, easy to read, and the Pyrex outer housing is non-fogging.

Improved Tests

In addition to improved control equipment, research has given us new analytical methods for the control of product quality. One such method has been developed for determining the set-

ting time in Cheddar cheese making by reduction of resazurin dye to its pink end point. When the milk is incubated at 86 deg. F. for 5 min. and the color changes to pink, the milk is ready for the addition of rennet.[18] A rapid method for determining extraneous matter in Cheddar cheese was published several months ago. It employs a 10 percent solution of sodium citrate as a solvent for the cheese.[19]

Further improvement in the Babcock method of testing milk and cream for butterfat content was effected when a new centrifuge was developed. The interior of the centrifuge is automatically maintained at the correct temperature. The machine is equipped with an air circulating duct and a heating element of adequate size, and there is provision for proper speed adjustment and measurement.

Also there has been recent improvement in the phosphatase test, as a public health safeguard to assure consumers that the milk or cream used for bottling purposes or for manufacturing has been adequately pasteurized. The improved test has been adopted by the AOAC as an official method for use with fluid milk and cream, Cheddar cheese, and soft, unripened cheeses.[20]

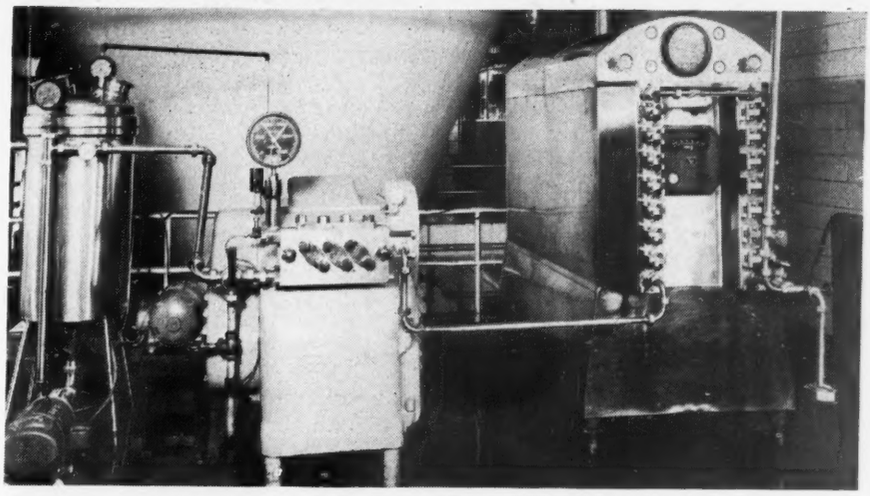
Utilization of the method of determining the true lactic acid content of ice cream as an indication of its quality was announced last year. The results from such an analysis aid in determining whether the ice cream was made from fresh sweet milk or cream, or from soured products. In the studies, it was found that, generally, the colorimetric method was accurate within 2 mg. percent.

No relationship was found to exist between the lactic acid content and the titratable acidity and pH of the mixes. It was concluded that fresh, unflavored ice cream mix should contain less than 10 mg. percent (0.01 percent) of lactic acid as measured by the colorimetric method.

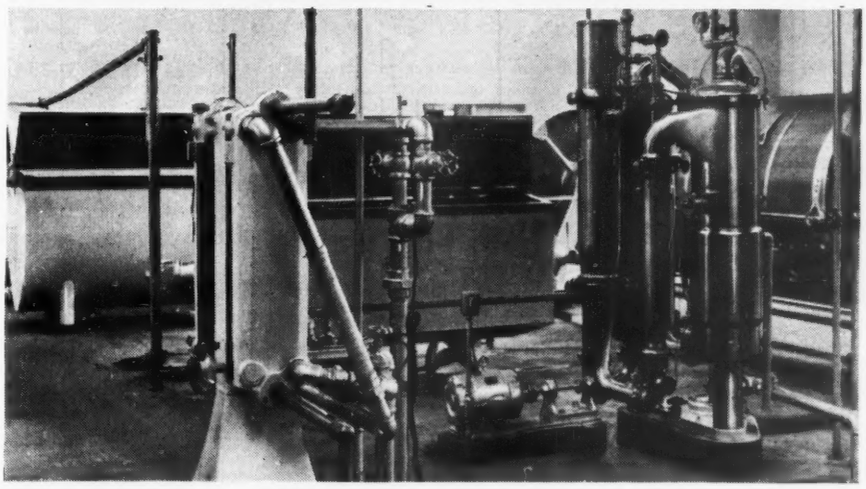
A simple method for standardizing the color of butter using ordinary creamery butterfat testing equipment has recently been devised.[21] The cream is warmed to 86 deg. F. in an 18 g. Babcock test bottle and is shaken with a few glass beads while being heated to about 104 deg. F. The fat is then extracted with petroleum ether, bringing the solvent containing the fat into the neck of the bottle and adjusting to a known volume. By the use of a photometer or color standards, it is possible to calculate the amount of carotene or other color to add to the cream in order to secure the shade desired in the final butter.

Special dairy products were developed to meet the needs of the armed forces. One of these was a sterilized caramel milk that could be used hot or cold as a quick source of energy when appetites were sluggish. The base was prepared from cream, milk, corn sirup, sucrose and salt. This mixture was heated with stirring to 160 deg. F. and homogenized at a pressure of 2,500 psi. It was then heated to 238 deg. F., cooled slightly, diluted with a small amount of water and flavored with vanilla. Caramel milk was prepared by adding 14 lb. of the base to 86 lb. whole milk. The product contained approximately 5 percent fat and 22 percent total solids. It could be canned and heat sterilized in the same manner as evaporated milk.[22]

New Equipment Facilitates Processing Operations



MALLORIZER (right) employs small diameter internal tubes to gain high heat transfer.



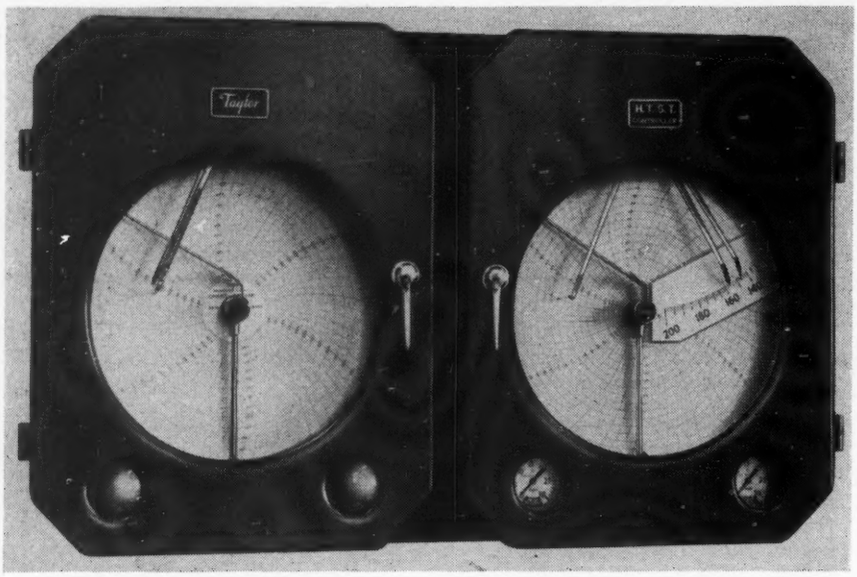
THE VACREATOR pasteurizes dairy products by heating them instantly to 190 to 200 deg. F. with direct steam. This is followed by treatment in two vacuum chambers.

Frozen Concentrated Milk

Frozen milk was also used to some extent during World War II, but the quality of the product was variable. Experiments on its manufacture and storage have been in progress during and subsequent to the war. A recently recommended method of manufacture follows: Using fine quality milk—of first importance—heat the milk to 170 to 180 deg. F., condense it to one-third the original volume, homogenize at 3,000 psi., cool to 40 deg. F., and place in containers. Quick-freeze the milk in a freezing tunnel and store at −15 deg. F. or lower. Prevent fluctuation in temperature. When reconstituting, place the block of frozen milk in the desired amount of water at a temperature of about 170 to 180 deg. F., and without agitation, allow it to melt.

Other products have been developed to supply the needs of certain branches of the industry. For example, high-fat content cream, usually known as plastic cream and used for the manufacture of ice cream and cream cheese, is in demand due to the savings in shipping and cold storage space. In its manufacture, high quality milk is separated to give cream containing approximately 40 percent fat. After pasteurization at a high temperature, this cream is cooled to 130 deg. F. and passed through an additional separator. The resulting cream should contain about 80 percent fat. By means of a special cooler, the plastic cream

Pasteurization Controls Have Been Greatly Improved



HIGH-TEMPERATURE short-time milk pasteurizer controller combines safety thermal limit recorder and water temperature indicating controller with cold milk record.

is quickly cooled to 60 deg. F., then placed in metal or paper containers and stored at a temperature of 0 deg. F. or lower.

The development of a new dairy food was announced during the March 1948 meeting of the Federated Societies. It consists largely of various milk solids supplemented with dried brewers' or cultured yeast, iron and calcium salts, and vitamins A and D. The food can be served as fried patties in sandwiches, as dairy balls and loaves, with spaghetti, and as croquettes. The loaves and balls are claimed to have a distinct meaty taste.[23]

Quality Control

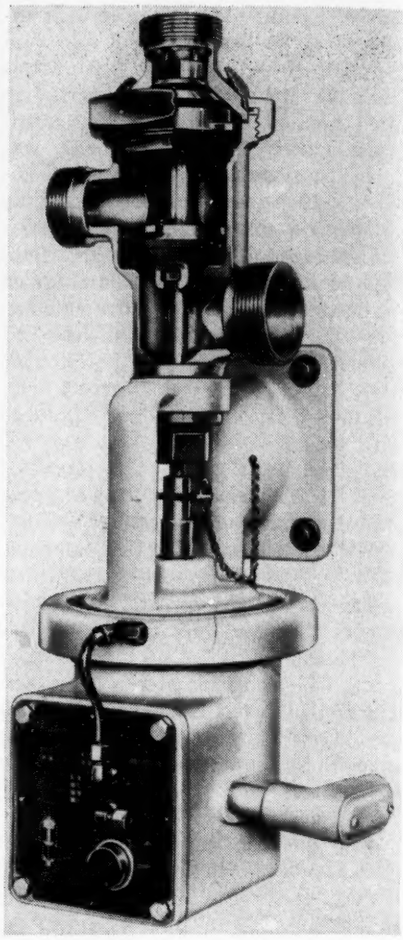
Control of the quality of dairy products has been the subject for experimentation by food chemists for many years. One of the toughest problems faced by them has been the development of objectionable flavors due to oxidation of fats. A concerted effort was made during the war years to develop chemical agents that would act as inhibitors of this oxidation. Partial lists of antioxidants have been prepared and the characteristics and the limitations of antioxidants as well as synergists have been discussed in the literature. The effectiveness of flavones and other phenylbenzopyrone derivatives as antioxidants for animal fats has recently been determined. It was found that the flavones quercetin, quercitrin, and rutin were effective antioxidants for milk fat as well as lard.[24]

The use of carotene obtained from plants, as a coloring agent for butter and as a source of vitamin A, has been investigated. Studies are now under way to determine a suitable carrier for this carotene. The carrier must be bland in flavor and have no unfavorable effect on the flavor of the butter when it is held in storage. Incidentally, some commercial coloring concentrates have been found to contain from 2,000 to 5,000 mcg. carotene per ml.

New types of ice cream stabilizers and emulsifiers, or combinations of both, have been introduced since the war. The basic materials used for the stabilizers have, in general, not been changed. They consist of gelatin, gums, sodium alginate and Irish moss. A recently introduced stabilizer is sodium carboxymethylcellulose.

Emulsifiers, added to the ice cream mix either separately or in combination with a stabilizer, favor the formation of small air cells in the ice cream during freezing, resulting in a smoother textured product. The commercial emulsifiers consist of mono- or di-fatty acid glycerides; esters of fatty acids with sorbitan; sorbitol; or esters of fatty acids and polyoxy alkylene derivatives of sorbitan. The addition of only 0.1 percent emulsifier results in a considerable improvement in the texture of ice cream when a batch freezer is used.

Population shifts and increased consumption have created new problems in the collection and distribution of milk. And shortage of farm labor has led to development of better handling methods. An example of the latter is an improved method of collecting milk from farms in tanks instead of in cans. Advantages claimed for this method are: (1) Better quality, since the milk is held at a lower temperature; (2) protection of the milk from dust contamination; (3) saving of labor, and



IMPROVEMENTS in design of solenoid valve and interlocking micro-switch make flow-diversion valve practically fool-proof.

(4) lower cost of transportation. The night and morning milkings are cooled to 40 deg. F. or below as soon as produced. The milk is stored in a covered, insulated stainless steel tank until the tank truck arrives. It is then agitated to give a uniform mixture, measured by a graduated stainless steel ruler, sampled for daily tests at the plant and pumped into the tank truck.

Some of the farm storage tanks are equipped with refrigeration coils and agitators. A sanitary stainless steel centrifugal pump is installed at each dairy and the milk is pumped through stainless steel piping and a white rubber tube connection to the truck tank. The rubber tube is left connected with the manhole cover of the tank truck between stops and is coiled under the dust cap of the cover to protect it from dust contamination.[25]

Milk Bottles

Improvements in glass milk bottle design to provide a lighter, more convenient container have been effected. One type is a "squat" round bottle, the quart size weighing 17¾ oz. and having a diameter of 3⅞ in.; the other

is a square bottle also weighing 17¾ oz. and having a diameter of 3 5/16 in. Both bottles utilize a cap of 1 5/16-in. dia. The round bottle requires a refrigerator shelf area of 15.015 sq. in., whereas the square bottle requires but 10.972 sq. in. The old style round bottle was taller and wider, also heavier.

The square bottle thus saves refrigerator space, is easier to handle, is said to be preferred by consumers, and more bottles can be carried per delivery truck.

More Paper Containers

There has been a tremendous increase in the use of single-service paraffined paper containers since World War II. The yearly manufacture is now about four or five billion containers. A quart paper container fabricated by one manufacturer has a bottom area of 7.91 sq. in. and weighs only 1.52 oz.

A number of advantages are claimed for the use of single-service paper containers for milk: 17 for the milk plant, 9 for the food store, and 8 for the consumer.

Among the advantages cited are that these containers are: Lighter and easier to carry, no empties to wash and return, refrigerator space is utilized advantageously, containers stack well, no deposits on container, milk pours easily, the milk is protected against light.

Merchandising Ice Cream

The consumption of ice cream increased from less than 400 million gal. in 1941 to above 700 million gal. in 1946, but dropped to 622 million gal. in 1947.

There is a definite opportunity for the industry to make two advances—to sell ice cream to a greater number of people and to increase the consumption per person.

The first can be achieved by advertising, by better package displays, by using improved display cabinets, by developing more retail outlets, by giving improved customer service, and by making an excellent quality product.

Second of the advances can be accomplished by the same means, and in addition there is a great opportunity to sell larger quantities of ice cream to families who have low-temperature home freezers. Instead of the former purchases of a one-quart package, these owners could be urged to take home a gallon or more. Ice cream would be eaten more frequently if it were readily available in the home at all times.

Sale of ice cream in one-gallon containers through dealers was pioneered by a large eastern manufacturer during 1945. The package soon became popular. During the spring of 1947, sale of ice cream merchandised in this manner comprised about 10 percent of the total sales by this firm in the trial cities.

Sale of ice cream in smaller containers can be increased tremendously by displaying it attractively in properly spotted, well-lighted reach-in cabinets. The use of insulated bags, sometimes containing a 2 or 3-oz. piece of dry ice, has greatly increased the take-home sales of ice cream in the large super-markets.

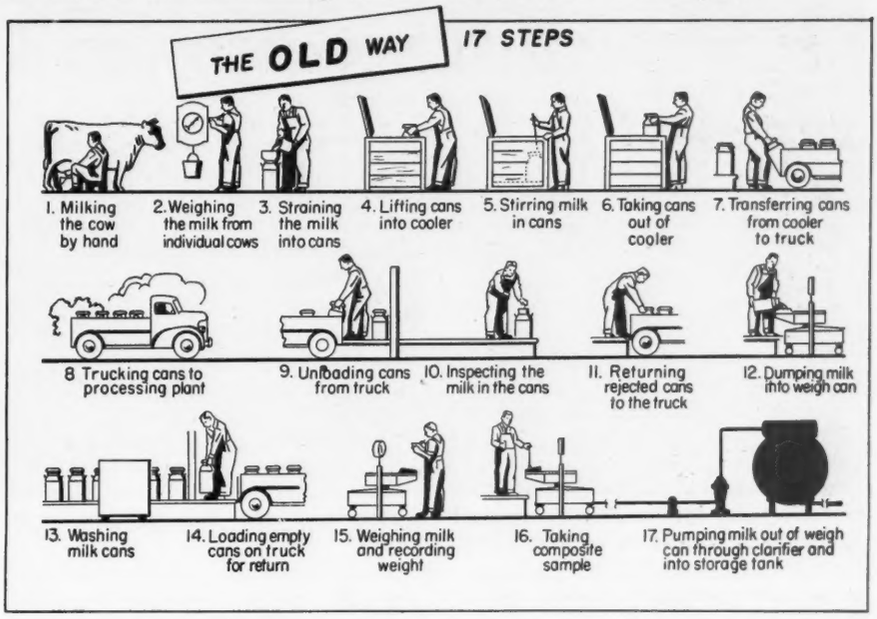
Many wide awake manufacturers merchandise factory-filled packages of ice cream of only 40 to 70 percent overrun, which conform to what the public wants and in the past could get only in hand-dipped type ice creams.

Merchandising natural cheese by cutting off wedges from a wheel at the time of sale is almost a thing of the past. The modern method is to sell either pre-weighed portions wrapped in transparent film, or 4-oz. to 5-lb. portions which have been packed in glass, tin cans, or transparent film in the cheese factory or central warehouse.

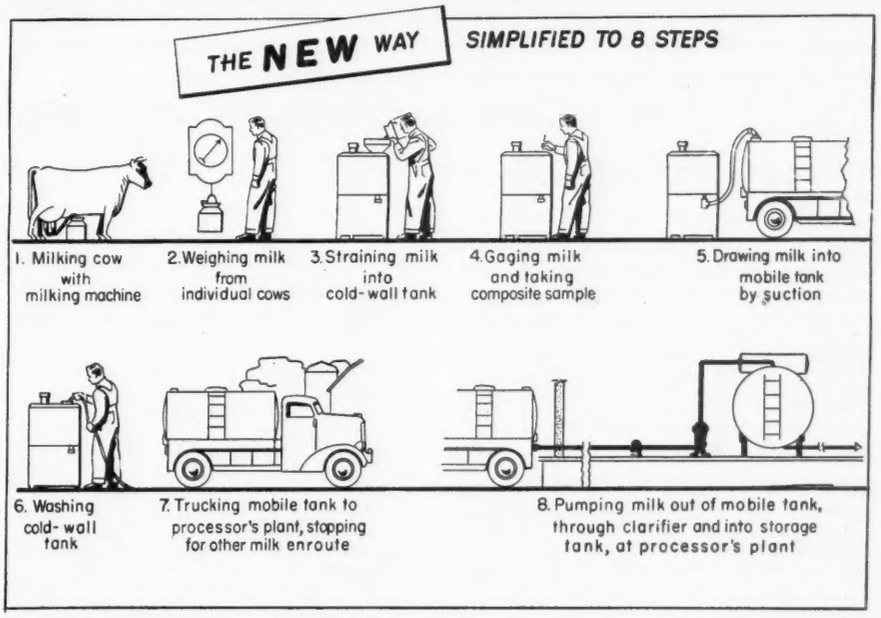
Plant Sanitation

Although improvements in the design of dairy equipment and new materials of construction have helped materially, sanitation is still a big problem in the dairy plant. New insecticides such as DDT and Chlordane, when periodically applied, are effective in ridding plants of flies and cockroaches.

Methods of Handling Milk Have Also Changed


THE OLD WAY
17 STEPS
1. Milking the cow by hand
2. Weighing the milk from individual cows
3. Straining the milk into cans
4. Lifting cans into cooler
5. Stirring milk in cans
6. Taking cans out of cooler
7. Transferring cans from cooler to truck
8 Trucking cans to processing plant
9. Unloading cans from truck
10. Inspecting the milk in the cans
11. Returning rejected cans to the truck
12. Dumping milk into weigh can
13. Washing milk cans
14. Loading empty cans on truck for return
15. Weighing milk and recording weight
16. Taking composite sample
17. Pumping milk out of weigh can through clarifier and into storage tank

Many sources of contamination were introduced in transporting milk from cow to processor.


THE NEW WAY
SIMPLIFIED TO 8 STEPS
1. Milking cow with milking machine
2. Weighing milk from individual cows
3. Straining milk into cold-wall tank
4. Gaging milk and taking composite sample
5. Drawing milk into mobile tank by suction
6. Washing cold-wall tank
7. Trucking mobile tank to processor's plant, stopping for other milk enroute
8. Pumping milk out of mobile tank, through clarifier and into storage tank, at processor's plant

Simplified method insures cleaner, better quality milk and also effects many economies.

For the destruction of rodents there has been invented a "radar" trap. It operates automatically, and after the animal has been killed with electricity, it is expelled from the trap.

Wartime and postwar research has brought out new cleaning compounds and improved methods of cleaning dairy equipment. The cleaning agents now contain compounds that will emulsify fat, penetrate to the surface of the equipment, condition the water used, and also react with the milk protein.

A group of quaternary ammonium compounds has been developed for destruction of micro-organisms that remain on cleaned equipment. Several tests for determining the concentration of a number of these compounds have recently been developed. One method is based on formation of a red precipitate after addition of quaternary ammonium compound to eosin yellow, followed by titration to a colorless compound with anionic surface active agent.[25] The test suggests wide applications for determining the concentration of dilute quaternary ammonium solutions. It also may be used to detect their presence in raw milk.

Additional Developments

Improvements in materials used for the manufacture of dairy equipment are continuously being made. A new stainless steel, "No. 20", has been developed. It is stated that this metal is highly corrosion-resistant, since it contains 3 percent copper in so-called cold solution. The copper is not soluble and does not affect the quality of milk or cream with which it comes in contact. The composition of the metal is: Carbon 0.07 percent, manganese 0.75 percent, nickel 29 percent, molybdenum 2 percent, silicon 1 percent, chromium 20 percent; copper 3 percent, and the remainder iron.

The scope of research and development activity is indicated by a checklist of miscellaneous inventions, improvements and processes touching on the dairy field. Among these are the following:

Coil pasteurizing vats equipped with sanitary rotary seals for coil shafts

Improved construction of continuous ice cream freezers

Automatic equipment for manufacturing chocolate coated bars

Improvement in the construction of milk and cream pumps

Automatically operated self-contained steam generators

Automatic dispensers for bottled milk and packaged ice cream

Use of aluminum foil for the wrapping of butter

Improved gaskets for the plate pasteurizers and for sanitary milk pipes

New equipment for reconstituting dry milk and for combining dry milk, butter oil and water

Improved ice cream and cheese package design

An improved all-electric automatic milk pasteurizer

New paints that are mold, acid and alkali resistant, also non-blistering when applied on damp surfaces

All-metal cheese vats and hydraulic metal cheese presses

A new refrigerant for keeping packaged milk, cheese and ice cream fresh during transit (the lightweight bricks or bags can be re-activated and used again)

Home electric pasteurizers.

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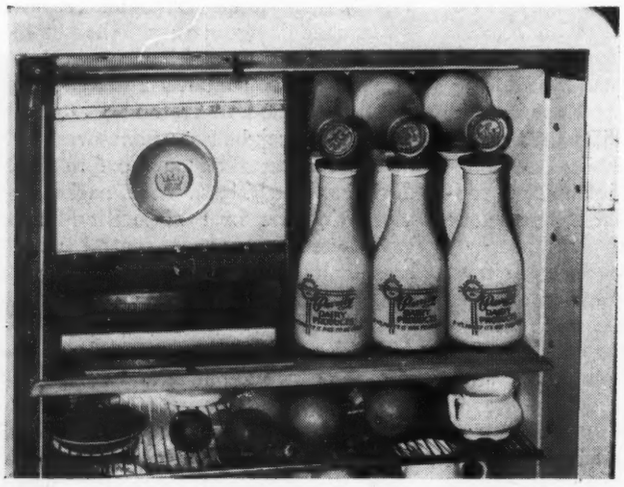


Conventional "Rounds" . . .

. . . . Versus Space-Saving "Squares"

Square bottles not only save space in home refrigerator, but also increase plant capacity and make possible larger loads per truck.

New Insect Test Cages Go "Right to the Spot" for—

Quick Checks on Fumigation

Vial-like insect cages fit on special insertion tubes — are readily driven into the goods to give fumigators proof of kill

AN easy-in, easy-out insect test cage has now been devised that gives immediate proof of an efficient kill when fumigating feed, food, and other stored materials. Former means of preparing, inserting, and checking test cages have been both involved and laborious.

The new, pointed, vial-like cage simplifies progress checks so that the right time to stop fumigation can be determined. Thus there are neither delays nor waste of money with underdoses or overdoses. A Houston, Tex., fumigation contractor—H. T. McGill Co.—developed the product.

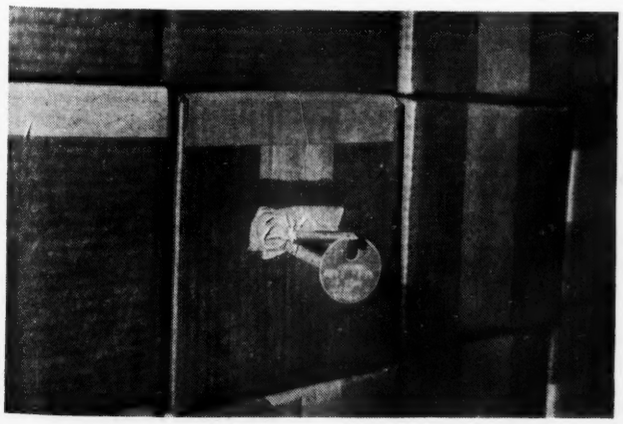
Resembling sharpened pencils, the new test cages are of metal or plastic, with diameters of $\frac{1}{4}$, $\frac{3}{8}$, or $\frac{1}{2}$ in. They have slitted openings 0.010 in. wide and $\frac{1}{4}$ in. long; thus the inserted insects are securely confined, yet the gas can reach them. The cages are screwed onto insertion tubes which are of corresponding diameters and which vary in length from 3 in. to 8 ft. for specific uses. The polished-body tubes reduce effort in making deep plants.

An aluminum identification disk is attached to the end of each insertion tube. For most accurate results, cages should be interspersed throughout the fumigation area. Diversity of placement provides a representative sampling and reduces possibilities of error.

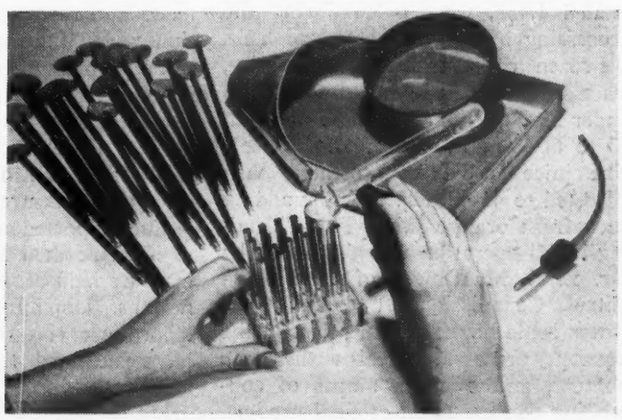
To test fumigation of bagged flour or grain, insects of a species known to be of value for the check purpose (like the confused flour beetle) are first inserted by funnel into the cage, which then is screwed onto an insertion tube 4 or 5 ft. long. Next, the tube is thrust deep into a bag. This operation is repeated in other bags in various parts of the warehouse. Proof of the penetration of the fumigant into the flour or grain is unmistakable when the caged insects are found dead. Loading of the insects into cages is speeded by the use of a funnel and a special block holding 24 cages.

In testing penetration of fumigant

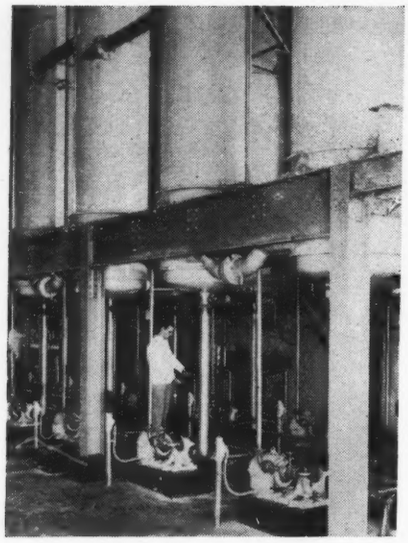
(*Continued on page* 218)

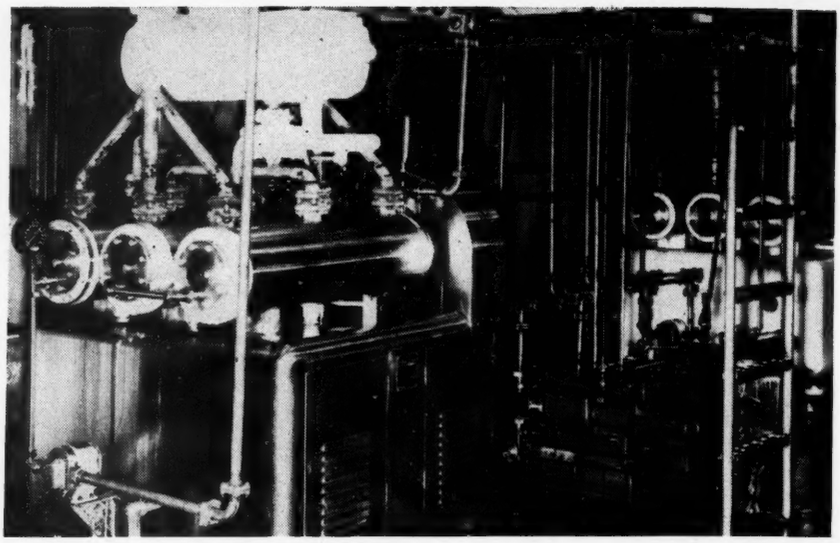


Carton Checking Is Easy, Too



And Insect Loading Is Speedy





Concentrated and Then Quick Frozen . . .

No loss detected in process. Ascorbic acid content, higher in recon-

By W. F. ROY, Chief Chemist, and H. E. RUSSELL, Chief Laboratory Technician, Vacuum Foods Corp., Plymouth, Fla.*

CONTROL LABORATORY data suggest that the nutritional value of orange juice reconstituted from the frozen concentrated juice is higher than that of the fresh juice. This was true during the 1947-48 season.

Reason for the higher ascorbic acid content is that when the final product is reconstituted, it is more concentrated than the fresh juice and soluble solids and ascorbic acid are higher.

The data, accumulated by Vacuum Foods Corp., Plymouth, Fla., cover seven months' production of frozen concentrated orange juice during the 1947-48 season. They represent frequent daily determinations of the ascorbic acid content of fresh juice and reconstituted concentrate. These ascorbic acid determinations, which totaled 1,432, were made during the processing of a million boxes of fruit.

Frozen concentrated orange juice, made by our company[1] is concentrated under high vacuum (10 to 15 mm.) at 50 to 60 deg. F. (left photo above). The juice is over-concentrated, then adjusted to 41-42 deg. Brix by adding back fresh orange juice. This "blending-back" operation was developed by Dr. L. G. MacDowell of the Florida Citrus Commission. It partially restores some of the volatiles lost in the vacuum process, increases the pulp content, and offers a means of controlling concentration of final product.

The final concentrated material is partially frozen at +15 deg. F. in Votators (right photo above). It is then in the consistency of a frozen sherbet. At this point, it is placed in cans and stored at—10 deg. F.

Ascorbic Acid Retention High

The object of the present investigation was to study the relationship between the ascorbic acid content of the fresh juice, and that of the concentrate as reconstituted for use. This information is of significance to users—particularly hospitals, dietitians, and parents who depend on this product as a principal source of ascorbic acid for infants and children.

Studies on retention of the ascorbic acid of orange concentrate produced in a pilot plant concentrator have been made and reported.[2] The mean retention under the conditions existing in the pilot plant was determined as 96.6 percent. Processing time in this operation was two to three hours. This amount of time was necessary because the product had to be recycled through a single concentrator.

Curl[3] reported a 97 percent retention of ascorbic acid in 41 deg. Brix concentrate held at 40 deg. F. for twelve months. Unpublished data from the laboratories of Vacuum Foods Corp. have indicated that retention of ascorbic acid in 41-42 deg. Brix orange concentrate held at —10 deg. F. for twelve months was 100 percent.

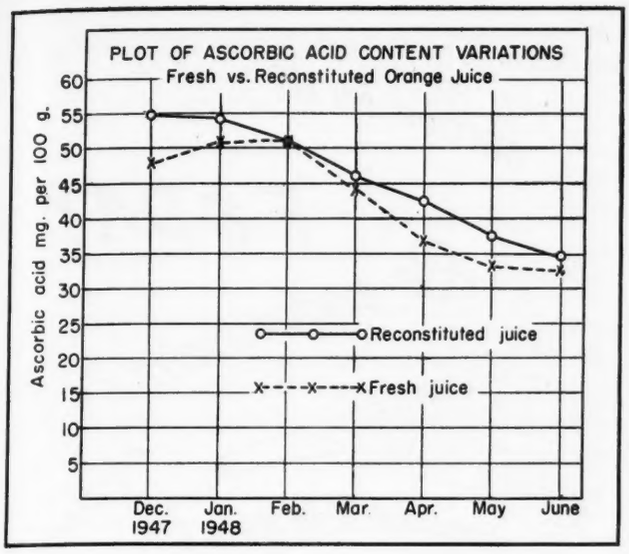
In the 1947-48 season more than 1,000,000 boxes of fruit were processed. Personnel in our control laboratory sampled fresh juice and concentrate during each hour of operation. From these samples, the ascorbic acid content was determined every fourth hour. The method used was that suggested by Ballentine,[4] namely iodate titration,[2] which requires less time and less frequent standardization—both factors being desirable in routine control work.

Thus, during the season, a total of 1,432 determinations, consisting of six determinations daily (the plant operates on a 24 hr. schedule) of ascorbic acid were made on fresh juice and concentrate. The mean of these determinations was calculated as a daily average, which was in turn averaged for each month of operation. These data are shown in the table (top right, opposite page), and in the adjoining chart.

It will be noted from the data in the table and chart that the mean ascorbic acid content of reconstituted concentrate was higher than that of the fresh juice each month, except in February. In that month, mean ascorbic acid content of fresh juice was slightly higher (50.9 mg. vs. 50.8 mg. per 100 g.).

There is an obvious reason for this apparent paradox. During the 1947-48 season, the fresh juice from all varieties of fruit contained less soluble solids (Brix) than usual. On the other hand, the Brix of the reconstituted concentrate is always a function of the degree

* Acknowledgment is made to M. A. Jimenz and D. B. Gawthrop for their contributions to the data presented here.



Tabulation of Ascorbic Acid Content Variations
Fresh vs. Reconstituted Orange Juice

Month	Year	Fresh Juice Mean Ascorbic Acid Content (mg./100g.)	Fresh Juice Standard Deviation (mg./100g.)	Reconstituted Concentrate Mean Ascorbic Acid Content (mg./100g.)	Reconstituted Concentrate Standard Deviation (mg./100g.)
Dec.	1947	47.7	±2.90	54.7	±3.86
Jan.	1948	51.0	±3.35	54.1	±4.05
Feb.	1948	50.9	±2.85	50.8	±2.10
March	1948	43.9	±6.29	45.8	±2.86
April	1948	36.4	±3.82	42.1	±2.35
May	1948	32.8	±2.37	37.2	±1.65
June	1948	32.3	±2 73	34.3	±1.46

. . . Orange Juice Retains Its Vitamin C

stituted concentrate than in fresh juice, varies with fruits' soluble solids

of concentration of the concentrate from which it was diluted.

Importance of Soluble Solids

Thus, when a concentrate of 41 deg. Brix is diluted for use by adding three volumes of water to one volume of the original concentrate, the resulting reconstituted product always contains 11.6 percent soluble solids. The juice derived from Florida oranges processed by Vacuum Foods Corp. during the 1947-48 season contained on the average about 10.7 percent soluble solids. Therefore, the final product as reconstituted for use contained a *higher* concentration of solids and ascorbic acid than was originally present in the fresh juice.

The magnitude of the difference between the mean ascorbic acid content of fresh juice and reconstituted concentrate fluctuated considerably from month to month. This fluctuation reflects the variation in soluble solids content due to varietal and rootstock differences.

For example, during December, the main varieties processed were Parson Brown and Hamlin fruit, most of which were grown on rough lemon rootstocks. These varieties, particularly when grown on this stock, are known to contain less soluble solids than some of the other varieties.

In January, the differences in mean ascorbic acid contents between fresh juice and reconstituted concentrate were less marked. And in February there was practically no difference. In the latter two months, most of the fruit received was of the Seedling and Pineapple varieties, of which the former usually has a very high soluble solids.

In March, some Seedling and Pineapple varieties were processed. This month also marked the beginning of the Valencia season. In April, May, and June, Valencia oranges were largely predominant. And the regular and progressive decrease in the difference of mean ascorbic acid content between fresh juice and reconstituted concentrate reflected the normal seasonal increase in soluble solids content of that variety.

Taste testing of the products resulted in an interesting finding. When taste panels are offered samples of reconstituted concentrate, together with samples of freshly expressed orange juice, frequently the majority of testers in the panel prefer the reconstituted concentrate. This is especially noticeable when the fresh juice contains a low soluble solids content. For reconstituted concentrate made from this juice will be richer and more palatable.

Another significant finding was that there was no detectable absolute loss in total ascorbic acid during processing. This finding is not in agreement with a previous report[2] based on pilot plant data. This disagreement is probably due to a shorter processing time—10 to 15 min. for production on a plant scale vs. 2 to 3 hr. for pilot production. Since the loss originally quoted was based on product made under pilot plant conditions, it is quite probable that decreasing production time to 1/12 has eliminated, almost entirely, ascorbic acid destruction.

The seasonal decrease in ascorbic acid content, as originally reported by Harding,[5] was reflected in fresh juice and reconstituted concentrate.

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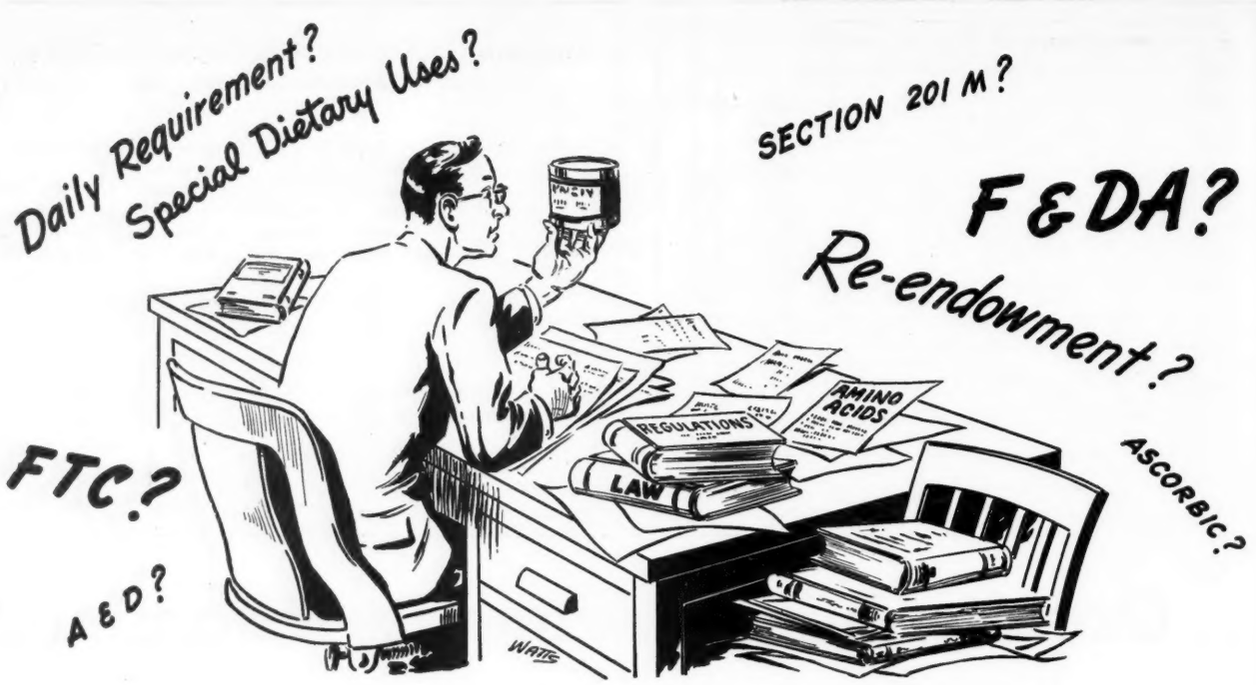
Demand for Frozen Juice Soars

Widespread public acceptance of frozen concentrated orange juice has, within the past three years, placed this product among the volume leaders in frozen foods. This acceptance is due to its retention of natural flavor and ascorbic acid content, and its ease of handling in the kitchen.

Public demand for the product will require a total pack in excess of 6,000,000 gal., or 768,000,000 4-oz. individual servings of reconstituted product in 1949. Since a gallon of the concentrated material contains the juice from about a standard box of oranges, this figure represents about 5 percent of the total orange crop in this country—a phenomenal increase, considering that the frozen orange concentrate industry is only three years old.



Nutritional Improvement Presents Many Legal Problems

Composition, labeling, advertising may all be subject to regulation when a processor seeks to enhance vitamin, mineral or other values

By FRANKLIN M. DEPEW, of Counsel for Standard Brands Incorporated, New York

FOOD processors who plan to improve their products nutritionally by adding vitamins, mineral salts and amino acids will find that such activities are regulated by two agencies of the government.

The law regulating the integrity of such commodities, including the labeling thereof, is under the jurisdiction of the Food and Drug Administrator of the Federal Security Agency. The advertising is under the jurisdiction of the Federal Trade Commission.

The foregoing would seem to make it apparent that there is a clear-cut division of authority with respect to these two types of activity. However, this is not the case. Advertising material which "accompanies" a food, drug or cosmetic is defined as labeling by Section 201(m) of the Federal Food, Drug and Cosmetic Act. The exact meaning of this work "accompanies" will be argued before the Supreme Court at its next term. Until such time as the Supreme Court speaks, it is the writer's opinion that if advertising literature (1) is needed in order to explain properly the use of the article or (2) can fairly be claimed to be intended to explain the uses thereof, it properly "accompanies" the article for the purposes of this Section and such advertising would be subject to the jurisdiction of the Food and Drug Administration.

The status of the law is somewhat perplexing, however, in those situations where the literature is not textually related to the product but depends on physical association and contiguity. There would seem to be no question but that advertising material shipped in the container with the article would "accompany" the article. Whether the jurisdiction of the Food and Drug Administration can be avoided in those cases where the advertising is not textually related to the product by making separate shipments is problematical. The safe position to take would be that if the advertising and the article are shipped to the same person and are to be used together by the receiver, they should be considered as "accompanying" each other. Advertising material which "accompanies" a food article is probably subject to the supervision of both F&DA and FTC.

Dietary Claims

Whether or not F&DA has jurisdiction over the actual advertising material, it has claimed, with some reason, that the advertising of a food or drug may determine the manner in which the article must be labeled to comply with the Federal Food, Drug and Cosmetic Act.

For instance, it is the position of the Administration that, if a food is advertised as having special dietary

value, it must be labeled in accordance with the regulations governing special dietary foods and may not be sold under a label making no mention of the dietary value. The Administrator has properly felt that it was his duty to take this position, in the absence of any Court decision to the contrary, in view of the language of Section 403(j) of the Act.

This Section provides that if a food purports to be or is represented for special dietary uses it shall be misbranded unless so labeled as to bear such information concerning its vitamin, mineral and other dietary properties as the Administrator determines to be and by regulation prescribes as necessary in order fully to inform purchasers as to its value for such uses. It is conceivable that some manufacturers might wish to advertise their products as having some dietary properties without setting forth all the information required by the dietary regulations. The F&DA has continued successfully to maintain the position that they may not do this and it seems unlikely that a court will overrule them.

This brings us to a consideration of the requirements of the special dietary regulations and of how we determine which foods must comply with the requirements of these regulations.

The F&DA has issued the following general regulation defining the term "special dietary uses," and all foods which come within this definition must be labeled as provided in the regulations covering dietary food labeling.

Nutritional Improvement

This article, fourth in the Food Industries current series on the nutritional improvement of foods, puts the processor on notice regarding the key legislation, regulations, interpretations which are likely to apply when the nutritional values of foods are modified, by improved methods of manufacture or by re-endowment or enrichment.

Written by a Standard Brands' attorney, the article will be found helpful by the processor himself and is in addition an authoritative digest for his legal advisers. There are definite provisions as to what the manufacturer may do, must do, may not do. And there are many points still undecided where the processor should take a conservative position, or risk action on the part of the F&DA, the FTC, or both.

Regulatory officials will discuss problems helpfully, says Counsellor Depew. The requirements are, however, arduous in some respects.—The Editors.

Special Foods Defined

"The term 'special dietary uses,' as applied to food for man, means particular (as distinguished from general) uses of food, as follows:

(1) Uses for supplying particular dietary needs which exist by reason of a physical, physiological, pathological or other condition, including but not limited to the conditions of disease, convalescence, pregnancy, lactation, allergic hypersensitivity to food, underweight, and overweight.

(2) Uses for supplying particular dietary needs which exist by reason of age, including but not limited to the ages of infancy and childhood.

(3) Uses for supplementing or fortifythe ordinary or usual diet with any vitamin, mineral, or other dietary property. Any such particular use of a food is a special dietary use, regardless of whether such food also purports to be or is represented for general use."

The paragraph number (3) in the foregoing definition is the one which is of principal interest to manufacturers of fortified or enriched foods. This regulation does not require that all foods which supplement the usual diet with vitamins, minerals or other dietary properties are subject to the special labeling requirements. Truthful claims, about a natural food normally a part of the diet, that are limited to the statement that the food is high in specified vitamins, will not make such a product subject to the labeling requirements of food for special dietary uses. Production and processing methods which increase the retention of nutrients in such products would not seem to bring them under the regulations. However, representations that such a food is for the particular purpose of rectifying conditions caused by

F&DA Key Statement of Policy Cited

Should a food be used to serve as a vehicle for adding minerals or synthetic vitamins to the diet? Do we know enough about the science of nutrition that we can assume with any assurance of safety that such action will not upset the nutritional balance of the diet? These important questions are among those puzzling food processors who are considering nutritional improvement of their food products.

In resolving these questions, such processors will have to give consideration to the statement of policy issued by the Federal Security Administrator. The Administrator is in charge of the Federal Security Agency, the branch of the federal government which regulates the integrity of foods, drugs and cosmetics through the Food and Drug Administration, under its jurisdiction. The statement sets forth in some detail the Administrator's viewpoint with respect to these questions. The statement reads in part as follows:

"The labeling or advertising of a food as enriched with vitamins and minerals is an implied promise to consumers that it contains, in addition to the normal constituents of the unenriched food, sufficient vitamins and minerals to make a substantial contribution to the nutritional welfare of persons eating the enriched food in customary amounts. In order to promote honesty and fair dealing by fulfilling this implied promise, it is necessary that the kinds and quantities of enriching ingredients be determined in the light of deficiencies of the various nutritional factors in the diets of the population in general and of significant population groups, the place occupied by the food in such diets, and the suitability and effectiveness of the food as a carrier of the enriching ingredients without undue separation or loss before consumption.

"Margin of Safety"

"Honesty and fair dealing will best be promoted if such enriched foods as are made available to consumers serve to correct such deficiencies and furnish a reasonable margin of safety. Enrichment above the levels required to accomplish this end is wasteful and contrary to the interest of most consumers; nutrient factors in concentrated form are available for use in those special cases of deficiencies in the diets of persons who do not constitute significant population groups. Enrichment of foods with nutrients that are supplied in adequate quantities by the diets of all significant population groups is not only wasteful but tends to confuse consumers as to their nutritional needs."

Legal Basis

Of course, this policy can have validity only if it finds support in the laws which have been enacted by Congress. We turn then to an examination of the laws governing the manufacture, sale and distribution of nutritionally improved foods, in the hope that such an examination will be of help to food processors in arriving at a decision as to whether they should attempt to improve the nutritional value of their products—and if so, how they should go about it.—The Author.

a lack of the specified vitamin would cause the product to be subject to the regulations.

On the other hand, other foods—like fish liver oils and vitamin and mineral preparations—by their inherent characteristics purport to be for special dietary uses and no additional representations are necessary to make such foods subject to the labeling requirements of food for special dietary uses. It is the position of the F&DA that the addition of any vitamins not naturally present to a food will make it a vitamin preparation purporting to be for special dietary uses, and thus subject to the labeling requirements. Thus the basis of the government regulation to date has been that either the restoration or addition of vitamins, minerals, etc. to a food makes it a food for special dietary uses and subject to the labeling requirements for such a food.

Ruling Opposed

Some food processors disagree with the Administration in its position that the mere addition of nutritional factors to restoration levels makes a special dietary food out of a food that would otherwise be a general purpose food. Some of these processors have considered the restoration of various processed foods to the original normal level of vitamins and minerals but have been deterred from taking this step because they would have to label such products as special dietary foods. This is a subject that these processors might consider reopening with the Administration. If they can show that they can produce such foods and have been deterred by these regulations they would undoubtedly receive a favorable hearing.

Having considered the factors which determine special dietary uses, the next matter of interest is the labeling statements required with respect to such foods. The provision of most interest to food processors is probably that requiring that if the need in human nutrition has not been established for any vitamin or mineral, the label must bear a statement to that effect. As a result of this requirement there is no incentive to add such vitamins or minerals to foods and the use of such factors has been confined, in the main, to the drug field. Enrichment and fortification in the food field have hitherto been confined principally to those vitamins and minerals the need for which in human nutrition has been established.

Minimum Daily Requirements

The dietary food regulations require, in addition, that the label shall bear a statement of the proportion of the minimum daily requirement for certain named vitamins and minerals, (whose need in human nutrition has been established), supplied by such food when consumed in a specified quantity during a period of one day. Where the minimum daily requirement may be different because of the differences in age or other reasons such as pregnancy or lactation, the statement must frequently include such proportion for each such group, depending upon the circumstances as set forth in the regulations. The quantity specified in the statement must be a quantity customarily or usually consumed during a period of one day or a quantity reasonably suited for practicable consumption during such period. The vitamins named in such regulation are vitamin A or its precursors, vitamin B_1 (thiamin), vitamin C (ascorbic acid) and riboflavin (vitamin B_2 and vitamin G), and the minerals named are calcium, phosphorus, iron and iodine. If a food purports to be or is represented to be for a special dietary use by reason of the inclusion of any vitamin or mineral not listed, the label is required to bear a statement of the quantity of such vitamin or mineral in a specified quantity of such food suitable for consumption during a period of one day. These regulations also contain other provisions, not of interest to the problems discussed here, relating to infant food, hypoallergenic food and food for the control of body weight, etc.

Amino Acids Covered

Foods to which amino acids have been added are considered by the F&DA as being foods for special dietary uses. These acids are frequently found in what is called a racemic mixture. This means that the acids are present in two forms, one part nutritionally available to humans and the other non-available. Dr. E. M. Nelson, Chief of the Vitamin Division of F&DA, in a letter dated July 20, 1945, stated that a food to which amino acids had been added must be labeled to conform with the regulations governing foods for special dietary uses. He further stated that in complying with these regulations, only the quantity of the active form of the acid—that which is nutritionally available—should be declared. The ingredient statement, however, must indicate that a racemic mixture is used if such is the case.

An exception to the amino acid labeling requirements is the use of monosodium glutamate in a food for flavor purposes, which will not, ordinarily, necessitate the foregoing declarations. It is anticipated, however, that the F&DA's position on MSG will be further defined in the near future.

As long as an unstandardized enriched or fortified food product is labeled in compliance with the requirements of the Dietary Food Labeling Regulations, such food must be considered as complying with the law. Even then, it is advisable for a concern manufacturing such products to bear in mind the statement of policy previously mentioned which was issued by the Federal Security Administrator in July, 1943, with respect to the fortification of foods with vitamins and minerals. This statement is of such importance to any food processor producing nutritionally improved food products that it seems appropriate to set it forth in full at this point. The statement is as follows:

Official Position

"The labeling or advertising of a food as enriched with vitamins and minerals is an implied promise to consumers that it contains, in addition to the normal constituents of the unenriched food, sufficient vitamins and minerals to make a substantial contribution to the nutritional welfare of persons eating the enriched food in customary amounts. In order to promote honesty and fair dealing by fulfilling this implied promise, it is necessary that the kinds and quantities of enriching ingredients be determined in the light of deficiencies of the various nutritional factors in the diets of the population in general and of significant population groups, the place occupied by the food in such diets, and the suitability and effectiveness of the food as a carrier of the enriching ingredients without undue separation or loss before consumption.

"Honesty and fair dealing will best be promoted if such enriched foods as are made available to consumers serve to correct such deficiencies and furnish a reasonable margin of safety. Enrichment above the levels required to accomplish this end is wasteful and contrary to the interest of most consumers; nutrient factors in concentrated form are available for use in those special cases of deficiencies in the diets of persons who do not constitute significant population groups. Enrichment of foods with nutrients that are supplied in adequate quantities by the diets of all significant population groups is not only wasteful but tends to confuse consumers as to their nutritional needs.

"Knowledge of the roles in human nutrition of various components of food, particularly the vitamins, is incomplete. There is reason to believe that as new information is developed food factors not now recognized as essential may be shown to be necessary to adequate nutrition.

"Most natural foods contain a wide variety of needed factors in significant amounts. It is highly probable that a diet of unenriched foods so chosen as to contain the required quantities of the presently known needed vitamins and other factors would more nearly supply all needed factors, known and unknown, than a diet which is raised by enrichment to adequacy in the vitamins and minerals now known to be needed.

"Even though adequate nutrition could be better assured, through the choice of natural foods than through reliance on enrichment, unenriched foods of the kinds

and in the quantities necessary for adequate nutrition are not now available to substantial parts of the population and are not likely to be available soon; nor are most consumers sufficiently educated on nutritional questions to enable them to make an intelligent choice of combinations of unenriched foods on the basis of nutritional values.

"Because of the lack of adequate production of a number of foods high in certain nutrients and the lack of consumer knowledge of nutrition, appropriate enrichment of a few foods widely consumed by the population in general or by significant population groups will contribute substantially to the nutritional welfare of consumers and to meeting their expectations of benefit. Enrichment of these foods which are not a substantial part of the dietary of any significant group tends to confuse and mislead consumers through giving rise to conflicting claims of nutritional values and by creating an exaggerated impression of the benefits to be derived from the consumption of such foods.

"If the customary process of manufacturing a staple food refines it so as to remove significant quantities of nutritive factors present in the natural product from which the food is made, and if the refined food is a suitable and efficient carrier of the factors so removed, some nutritionists advocate the restoration of such factors to the levels of the natural product as the most desirable basis of enrichment. To the extent that restoration serves to correct deficiencies of such factors, it is consistent with the promotion of honesty and fair dealing that refined foods be enriched on a restoration basis. However, when the evidence shows that the restoration levels are too low to correct deficiencies, or that deficiencies exist in other factors for which the refined food is an efficient carrier, the promotion of honesty and fair dealing may require the inclusion of corrective quantities of nutritive factors in the enriched food even though such factors are present in smaller quantities or wholly lacking in the natural product from which the food is made. Similar considerations may require the enrichment of unrefined foods."

The foregoing statement of policy indicates that F&DA will establish standards for foods in those cases where, in their opinion, the unstandardized food product is making a wasteful use of the vitamin or mineral, or is tending to confuse consumers as to their nutritional needs.

Basic Conclusions

At the present time it seems that most food processors have reached the same conclusion as the Federal Security Administrator with respect to the program to be followed in connection with nutritionally improved foods. This was emphasized in the first article of this series by Dr. Haldane Gee, where it was pointed out (1) that most food processors are emphasizing processing improvements rather than trying to find a list of things that they can mix into their food products, and (2) that where vitamins or minerals are to be added to a food, it is agreed that for many foods a higher than restoration level is not in the interest of the public. There naturally have been some differences of opinion among processors and the Administration as to what is best for the public interest. The manufacturers of cacao (chocolate and cocoa) products have felt that these products offered a good medium for enrichment. F&DA has taken the contrary view. There has been some litigation on the matter, which is not yet settled. The standards for cacao products issued to date have not provided for any enrichment of these products.

Enforcement Policy

In order to understand the method which the F&DA has used to enforce its policy with respect to the enrichment and fortification of food products, it is necessary to know something about the provisions of the Federal Food, Drug and Cosmetic Act which authorize food standardization. Section 401 of the Act grants F&DA the power to standardize a food when in its judgment such action will promote honesty and fair dealing in the interest of consumers. This includes the power to specify what the ingredients of such a standardized food shall be. This is technically called establishing a definition and standard of identity. It is doubtful that the Congress realized that this power would be used by the Administration to carry out a policy with respect to nutrition. However, the courts have construed the power granted by this section as authorizing the standardization of a food, although such action might automatically outlaw all other foods which may be indistinguishable from it no matter how beneficial they may be or how distinctively they may be labeled so as to distinguish them from the standardized food product. As a result of this interpretation of the section, it is impossible to add vitamins, minerals, amino acids, etc., to a standardized food product except as may be provided for in the standard itself.

In some cases a standard has provided for a single commodity to which an enriching ingredient may be optionally added. This is the case with respect to oleomargarine, to which vitamins A and D may be added at the option of the manufacturer. In the case of other commodities the approach has been to standardize the unenriched and the enriched article as two separate products. The standard for the enriched product has set forth certain limits of enrichment which are required in order to meet the standard of identity.

This has been the method used with respect to the standardization of cereal products whereby standards have been established for enriched flours, enriched farina, enriched macaroni and noodle products, enriched corn grits and enriched corn meals. Standards have been considered, but not yet issued, for enriched bread, and enriched rolls or enriched buns.

Standards of Identity

There are now in effect well over 100 definitions of standards of identity for various food products. None of these standards, with the exception of those just mentioned, provides for the addition of any vitamins or minerals. This does not seem to have slowed down to any great extent the program to improve the nutritional value of foods, as the foods so far standardized have been, in most instances, those of a type which the food processor or manufacturer would not be interested in fortifying or enriching. A possible exception to this is the class of cacao products, which has been discussed above. Another class of products where enrichment to restoration levels may be considered desirable is that of processed fruit and vegetable products, including tomato juices and jam and jellies. Many canned and frozen fruits and vegetable products have been standardized without provisions for such restoration. If it should appear feasible to embark on such a program, F&DA will undoubtedly consider holding hearings, on receipt of petitions to amend the standards for these commodities to allow such enrichment.

It is worthy of mention that hearings either to establish or to change food standards are highly technical in nature. They are properly considered by those who have attended them as being expensive and time-consuming particularly for the small manufacturer.

Caution Indicated

In the light of the foregoing, what policy should food processors adopt with respect to nutritional improvement of their food products? In view of the fact that as yet we know so little about the science of nutrition, it seems obvious that they should proceed with caution. In most instances they should not go beyond striving for greater retention of nutrients during the production and processing of their products. In those cases where enrichment ingredients are added, they should normally confine such enrichment to the restoration level. Processors should neither request nor petition the F&DA to exercise the standard-making power as a method of implementing the processors' program, but should recognize that this power should be used, if at all, as a

(*Continued on page* 213)

Grueling Route Service Doesn't Faze . . .

All-Steel Milk Trucks

Bodies designed for added strength and lighter weight stand up under severe operating strains, while resisting destructive effects of water

ALL-STEEL retail milk truck bodies, which are lighter than either the wood or wood-and-metal composite types, are helping to cut distribution costs in areas of western Pennsylvania and West Virginia. Designed by the Schnabel Co, Pittsburgh, they are the result of long experience in building truck bodies for use in these areas, where the terrain is extremely rugged.

Milk delivery service, even under the most favorable conditions, is destructive of both body and chassis. The many starts and stops made over the delivery route, the sudden swerves from the stream of traffic to the curb, and the twists and lurches of turning corners add up to above-average stresses and strains.

All Steel

The destructive effect of such stresses is many times greater in hilly country, where pavements are frequently rough and streets steep and crooked. To produce a long-life body to meet such severe service conditions requires special construction—yet there should be no extra structural weight to add to distribution costs.

Attacking the problems of carrying heavy loads under extremely severe service conditions, Schnabel engineers over a period of years developed the light, all-steel body pictured here. It is standard with a majority of the largest dairies in western Pennsylvania, and West Virginia. In other less-severe territorities, its life should be appreciably longer.

Two Sizes

These bodies are produced in two standard sizes, one 84 in. long, adaptable for any conventional ¾- to 1-ton truck chassis, and the other, a 96-in. long body for any 1½-ton chassis.

The only difference between the 84 in. and the 96 in. bodies, is that the larger body has a longer side panel. These additional 12 in. make possible an extra tier of cases. Usual load runs 12 or 16 cases to the tier.

The weight of the 84-in. body is 1,400 lb. and that of the 96 in. body, 1,500 lb. Comparative weights of wood or composite wood-and-metal bodies are approximately 1,800 lb. for the 84 in. size and 1,950 lb. for the 96-in. size.

The cut in body weight, while relatively small in pounds—400 to 450—is nevertheless approximately 20 percent of the total body weight. Any reduction in body weight, however, is a reduction in total vehicle unladen weight, and as such is an advantage, since it tends to bring down gasoline consumption and tire wear.

The carrying capacity of these bodies depends, of course, upon the tiering. The 84-in. body will carry 44 cases of 4x4 round bottles or 71 cases of 5x5 square bottles if tiered three cases high, and 60 and 96 cases, respectively, with four-case tiers. Likewise, the 96-in. body carries 56 cases of 4x4s or 86 of 5x5s for the three-case tiering, and 76 and 116, respectively, when the cases are four tiers high.

Resists Water

Another advantage of the use of steel in this body, aside from its additional strength and lesser weight, is its greater resistance to the destructive effect of water. With the possible exception of bodies carrying fresh meats and green goods, no other commercial bodies are washed inside as often as milk truck bodies. Milk bodies are also subject to the effect of water in the form of melted ice, used initially in the form of shaved or cracked ice to maintain low temperatures in the summer season.

While steel is subject to water rust,

the galvanizing of body floor and inside lining panels serves to deter the rusting action. This is more effective against deterioration than measures taken to check the rotting of the wooden counterparts. When once the wooden members begin to rot, splicing in of new sections is an expensive and often ineffective repair.

Body Construction

While, to the uninitiated, these bodies may appear to be like any other milk bodies, they have several features of construction that are noteworthy. First, the subframe is made of formed channel steel, electrically welded. Next, the framing which provides the base structure for the sides, ends and roof, is made of formed steel Z-bars, nested and welded to the subframe.

Outer sides are made of 20 gage automobile sheet steel insulated with rust resistant mastic. The inside lining on the sides and ceiling are galvanized sheet steel, with the sides corrugated to provide bumper rails at each case height.

The front of the body, to be formed to the cowl coming with the truck chassis, is made of one piece, 14-gage steel. Body corners are made of 14-gage steel, formed on a 4 in. radius. The roof is all steel, with the sides and ends made on a 4 in. radius, with integral drip molding. Inside, the roof is insulated with 2 in. of Fiberglas.

The floor—of prime importance because it has to stand the wear of sliding cases—is made of 12-gage safety steel plate, the deformed surface tending to prevent the driver from slipping when the floor is wet. The front door pockets and the rear wheel housings are made integral with the floor. Wheel housings extend for a three-case length to the rear of the body. And the stepwells, at the front in the driver's seat section of the body, are recessed to the chassis frame on a level with the running boards. They are made of 14-gage steel with a 16-gage safety tread plate overlay.

Safety Glass

Driver's doors, opening into the stepwells, are each 29½ in. wide. They are all steel and of the sliding, mastic-insulated type, with safety glass windows set in patented leak-proof rubber, and with two-way locks, meaning the doors can be locked open or closed.

The rear doors, which provide a 30 in. opening, are of the double type, all steel, mastic insulated, with piano hinges and a slam type inset lock. Also, there is a safety glass window set in runner in each door. An adequate rear bumper, made of heavy duty channel-form steel, is attached direct to the chassis frame with an L-bracket.

Scandinavian Food Technology

Processed and prepared foods are being made in modern plants, but packaging materials are difficult to get

ALTHOUGH serving a relatively small market, food processors in the Scandinavian countries are operating modern, showplace factories where the most advanced methods of management and technology are being applied. Two difficulties the industry has to deal with at the present time are the foreign exchange situation and the scarcity of all kinds of packaging materials.

This summary of current conditions in Sweden, Norway and Denmark was offered by Dr. Aksel Olsen, manager of the Central Laboratories of General Foods Corp., Hoboken, N. J., in a talk at a recent meeting of the New York section of the Institute of Food Technologists. Dr. Olsen reported on his trip made this year to the three countries of Scandinavia, where he had an opportunity to exchange views with the leading food technologists and to visit typical processing establishments.

Shortage of U. S. dollars has severely limited importations of American prepared foods, with the result that European processors have a wide open market for their new products—such as the dessert powders, prepared mixes and baking powder recently placed on the market by one of the Swedish manufacturers. In the case of baking powder, one importer formerly supplied 90 percent of the market. His trade has now vanished, but the domestic manufacturers are doing a thriving business.

Model factories and advanced personnel programs are two features which are counted on in building good consumer and labor relations. On the technological side, problems of taste testing and quality control are receiving attention in the laboratories.

Prepared Meals

A field in which great strides have been made is that of the prepared meal, with well-established stores handling the meals for over-the-counter sale and also offering delivery service.

An example of differences in the art here and in Scandinavia is the status of freezing. Freezing methods are advanced, well known and widely used, but the Europeans have not yet developed the retail, consumer package to any extent.

Packaging problems have beset all branches of the industry, Dr. Olsen reports. The same product may appear in glass or in tins, or even in earthenware containers, depending on what happens to be available. In Norway, aluminum cans are being used, of necessity. The industry suffers from lack of base steel suitable for cans.

Training of Technologists

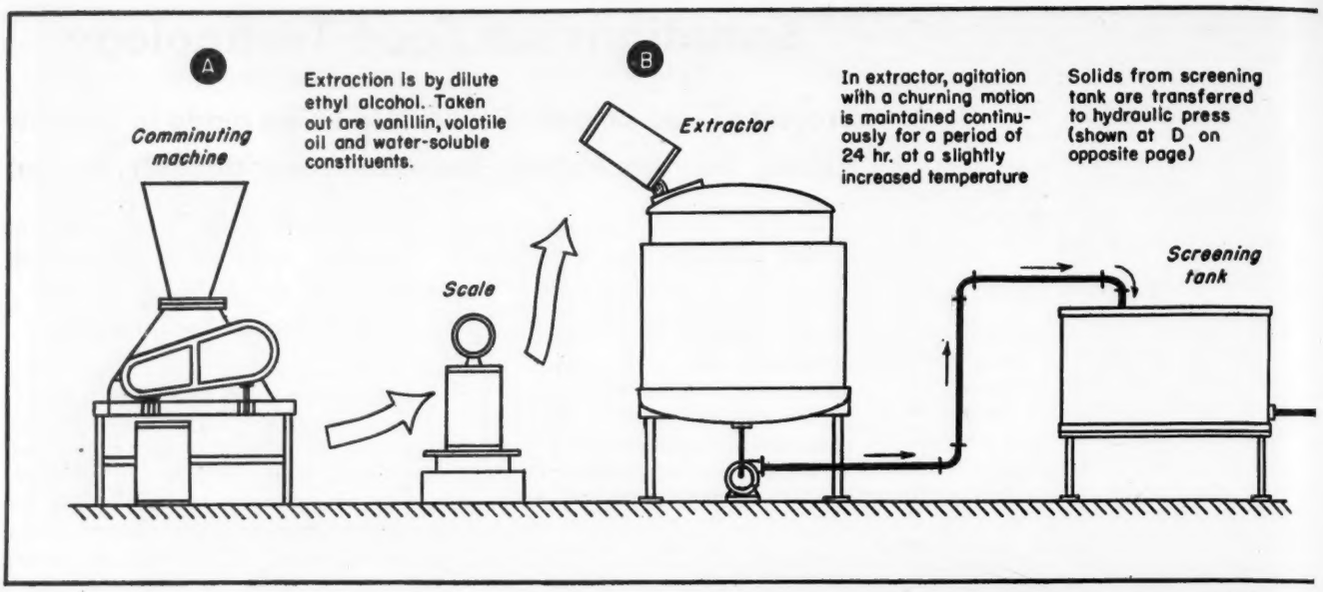
Commenting on the training of food technologists, Dr. Olsen noted differences in educational methods. Institutes in Norway, Denmark and Sweden, many of them of world renown, are centers for research in the various branches of the industry. These are supported in part by the industry and in part by the state. Personnel training is carried on in commercial laboratories to a large extent.

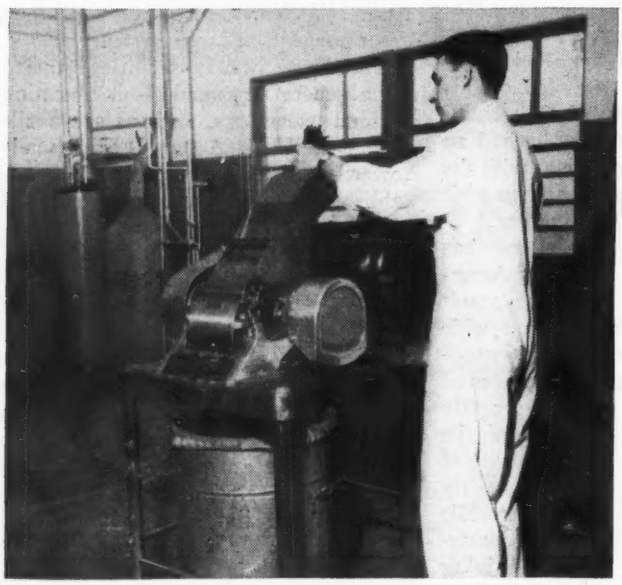
There have been no facilities hitherto for a general or rounded-out education in food technology, such as are available in the U. S. A start is being made towards filling this need with the establishment of a department of food chemistry at the Stockholm Institute of Technology, and with the founding of an institute of "food preservation" at Gothenburg, Sweden, in the near future.

International exchange of information is still somewhat limited by the foreign currency situation, Dr. Olsen reported. Although the European countries are anxious to send representatives here, and do so, the trips arranged are limited in number and extent by the U. S. funds the sponsors have available for travel.

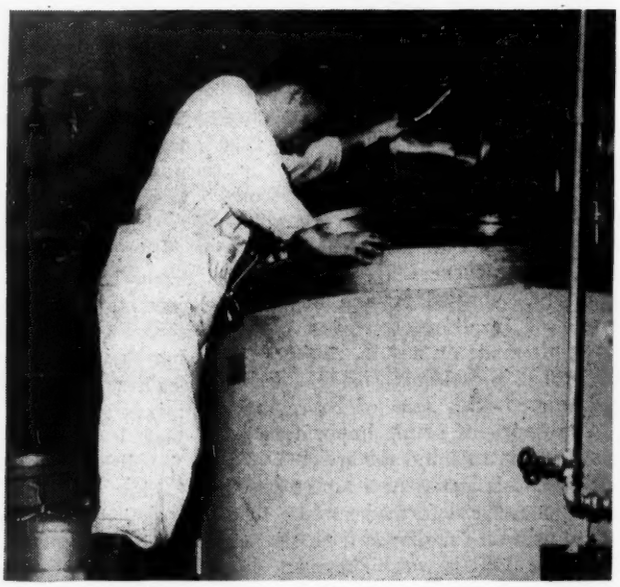
For their part, the Scandinavian countries made elaborate arrangements for Dr. Olsen's trip, which was sponsored by the Ingeniörs-vetenskaps-akademien, otherwise called the Royal Swedish Academy of Engineering Sciences. This organization, popularly known as the IVA, was founded in 1919 under the auspices of the government. The Academy acts as official adviser to the government, and as a clearing house for research within the very broad field of applied scientific research, including everything from pure engineering in the ordinary American sense to agricultural and food research.

A State Council of Technical Research was established in 1942 on recommendation of the IVA. The two organizations, Academy and Council, are closely associated in the promotion of scientific research in the broad field of technology. A current joint project is that of stimulating Swedish food technology by arranging for lecture tours by American specialists in that field.


A
Comminuting machine
Extraction is by dilute ethyl alcohol. Taken out are vanillin, volatile oil and water-soluble constituents.
B
Extractor
In extractor, agitation with a churning motion is maintained continuously for a period of 24 hr. at a slightly increased temperature
Solids from screening tank are transferred to hydraulic press (shown at D on opposite page)
Scale
Screening tank



A. **BEANS are first shredded in a balanced comminuting machine, without raising temperature of the vanilla.**



B. **THEN shredded fruit and solvent (menstruum) are agitated in special stainless-steel extractors.**

Vanilla Extract Processing Speeded

New plant doubles production—yet no more employees are needed than worked in old plant

By ROBERT W. BREIDENBACH, Chemist, In Charge of Research and Control, Standard Vanilla Co., Los Angeles

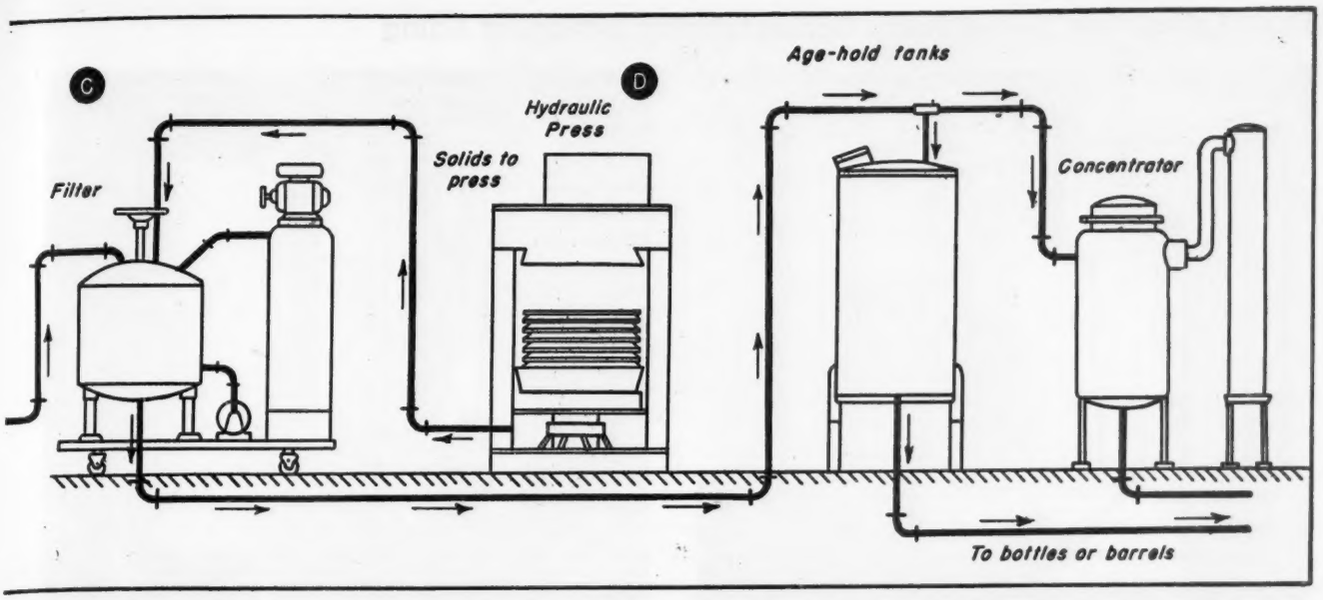
PRODUCTION of vanilla extract has been doubled in the new Los Angeles, Calif., plant of the Standard Vanilla Co. without any increase in personnel—for through orientation of equipment, more efficient flow of materials, and staggered production schedules, workers now handle twice the previous volume with fewer wasted steps and at no greater effort.

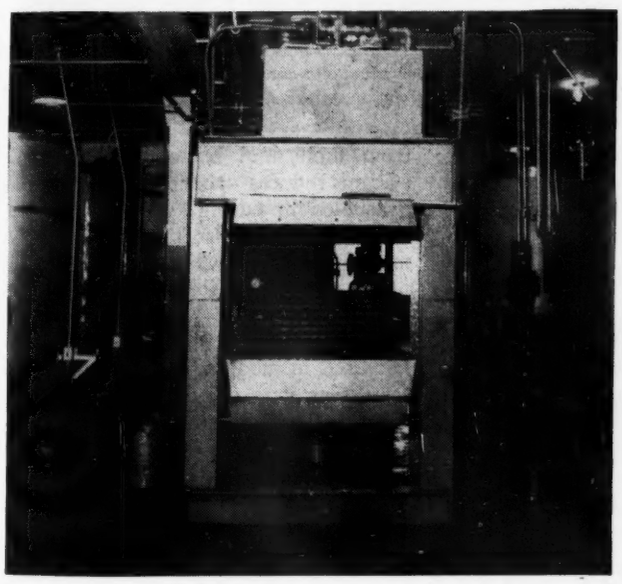
Additional equipment in the processing line permits production schedules to be so arranged that one man can handle several batches simultaneously without being overburdened, each batch being in a different state of processing —i.e., extraction, washing, pressing or filtering. Standard's system of extracting is almost entirely closed.

Processing Operations

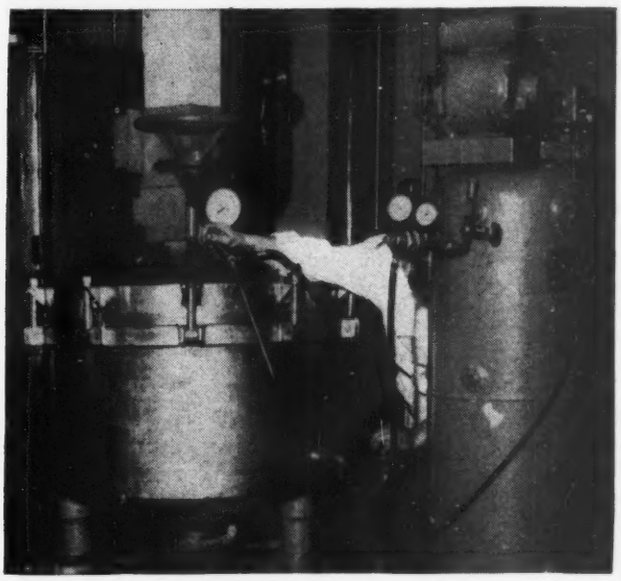
Each shipment of vanilla arriving in the plant is examined for quality and grade, according to specifications, and then catalogued. During inspection samples are taken from each box and sent to the chemical laboratory to be tested for moisture content. This is necessary because nearly all the vanilla received varies slightly in moisture content.

From these data, an overall average of grade, quality and moisture can be obtained, making it possible to select the vanilla for each successive batch





C. SCREENING follows, then the material is pressed in pads in this hydraulic press to remove the alcohol.



D. COMBINED extracts and wash water are next passed through a filter using diatomaceous earth filter aid.

with assurance of a high degree of uniformity.

The first step in the actual processing of vanilla is the shredding of the whole beans. This is done in a delicately balanced comminuting machine without raising the temperature of the vanilla. The beans are shredded into particles of small enough size to permit thorough penetration of the solvent and efficient solution of the bean extractive matters. The shredded vanilla is weighed very carefully to the requirements of the batch formula and is then ready for extraction.

About the Solvent

In the extraction process, dilute ethyl alcohol is used almost universally as the solvent, and to the trade, the extracting solvent preparation is known as the "menstruum". To obtain the best results, the menstruum should contain approximately 50% ethyl alcohol (47 to 50 percent alcohol is recommended by the Research Committee of the Extract Manufacturers' Assn.). Before coming into contact with the vanilla, the menstruum is always mixed thoroughly. It will extract nearly all the vanillin, volatile oil, water-soluble constituents, and most of the color and resins—though it will not extract the undesirable gum, fat and wax.

Extraction Method

In order to take out the vanilla, the shredded fruit is placed in the menstruum in a patented extractor. This, basically, is a specially designed, stainless-steel-jacketed tank in which the vanilla and menstruum are continually agitated with a churning motion for a period of 24 hours and at a slightly increased temperature. This agitation assures the contact of all the finely divided vanilla particles with the warm menstruum and allows an extraction as complete as it is possible to get with the initial menstruum. When this is accomplished, the menstruum is drawn off from the solids into a stainless steel holding tank. A second menstruum is pumped in with the "beans" and is handled in the same manner.

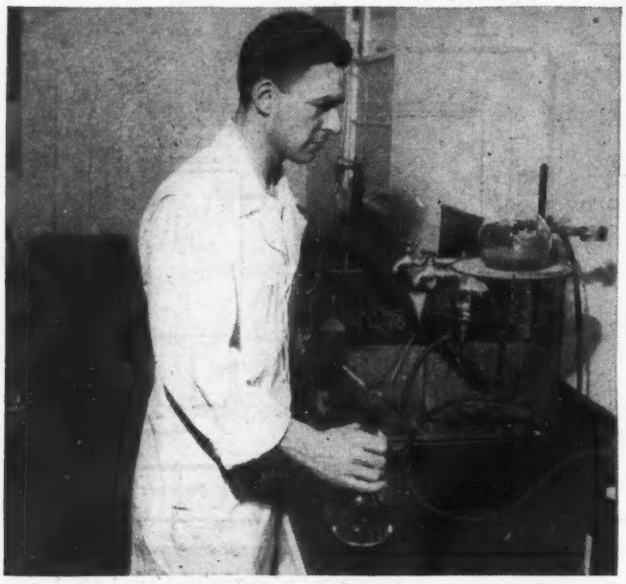
Press Used

After separating the second menstruum from the solids, the "beans" are pumped from the extractor into a screening tank, where they are washed twice with water. They are then pressed in pads in a hydraulic press, under approximately 300 tons' pressure, in order to remove the alcohol.

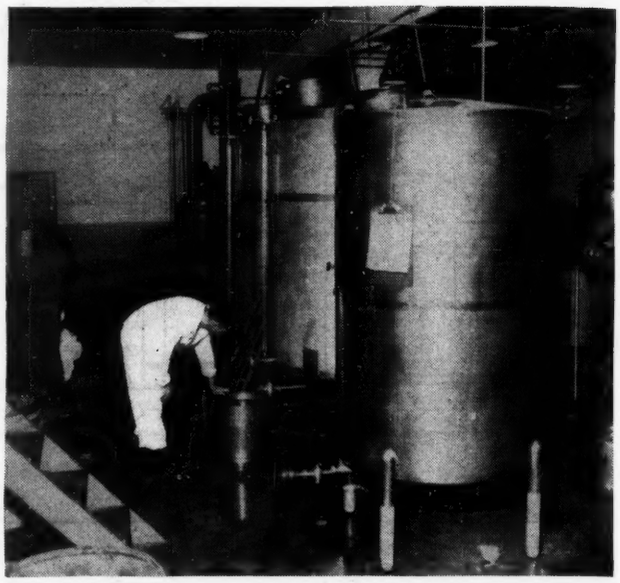
All the extracts and wash-water are combined and filtered—through either a plate and frame filter or a horizontal plate type filter with the aid of diatomaceous earth—into stainless steel storage tanks. Here, the batch is tested, built to the proper alcohol content and volume, and then allowed to age for a minimum of three weeks.

From the aging tanks, the finished

From Laboratory Tested Beans Comes Quality Extract for Aging



SAMPLES from each box of beans received are sent to the company laboratory and tested for moisture content.



BROUGHT to the proper alcoholic content, batches of the extract are allowed to age in these stainless-steel tanks.

extract is pumped, when ordered, to a bottling machine for packaging in gallon jugs, or into barrels for shipment to the customer.

Vanilla concentrate or oleo-resin is produced by diverting the extract from the filter into a concentrator, where it can be brought to any desired strength requested.

To manufacture powdered vanilla flavors, the company plant is equipped with a specially designed micro-pulverizing machine which reduces the whole vanilla bean to microscopic particles finer in size than face powder.

As described earlier in the article, actual extraction processing is preceded by testing the vanilla to determine the variations in moisture content.

Scientific Curing

To overcome the inherent inequality of the curing processes and to assure the production of a uniform product, the company developed, through six years of research, a scientifically controlled method of curing vanilla—a method which is superior to the old processes in that it eliminates the loss of the flavorful juices and the spoilage from mold and bacteria. This new system reduces labor costs and time consumed in curing, while producing a standardized product of constant moisture content which is marketed to processors in a form all ready for extraction.

By this method, the green fruit can be cured in modern, specially designed sterilizing vats, dehydrated with scientifically controlled equipment and sealed in cans at a controlled moisture content in three days. This process is now operated by a Mexican company in Teuizitlan, Pueblo, Mexico.

Vanilla Has an Interesting History

A PRODUCT of American origin, vanilla is the cured, full grown, unripe fruit of an orchid, a native of Mexico. According to the oldest records, the birthplace of vanilla was the valley of Misantla in the southeastern lowlands of Mexico. Now part of the state of Vera Cruz, this valley was in early times, and is still today, the only important locale of vanilla culture in Mexico.

Of singular interest is the fact that the Indians who cultivate the vanilla today are direct descendants of the ancient tribes who found it growing there as they wandered down from the north shortly after the time of Christ. Historians of the Cortez expedition describe the use of vanilla by the Aztecs for flavoring chocolate and other dishes. From the Courts of Montezuma, it was first introduced into Europe by the conquering Spaniards.

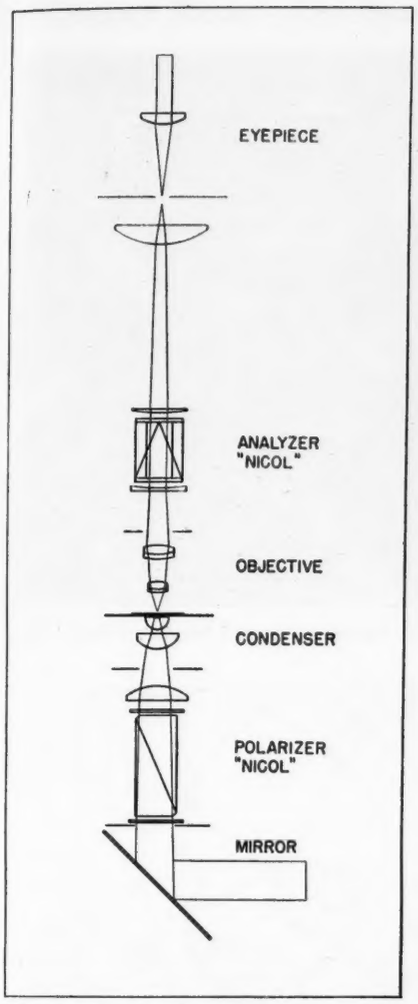
In 1807, cuttings of the Mexico vanilla plant were successfully cultivated in Padington, England, and from this source the botanical gardens of Paris and Belgium were supplied. France and Belgium, in turn, later succeeded in vanilla cultivation on the islands of Bourbon (Reunion) and Java, and at the present time, vanilla is grown commercially in Mexico, Madagascar, Reunion, Mauritius, Tahiti, Java, the Comores, the Seychelles, Guadeloupe, Martinique, Puerto Rico and the Fiji Islands. All the plants in all these places are derived directly or indirectly from the original Mexican cuttings.

The vanilla vine is a dark green, perennial, climbing plant having aerial rootlets by which it clings to the tree or frame which supports it. The vines are cultivated from cuttings planted near small trees of certain varieties, selected to produce the correct amount of light and shade.

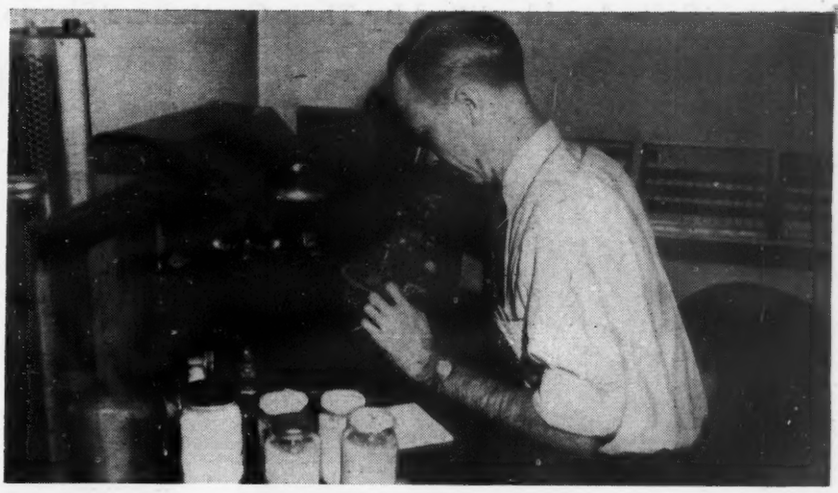
Ostensibly, the plant does not, as commonly supposed, obtain nourishment from the supporting tree. As for growth, it takes about three years for a vanilla vine to reach maturity, and it will produce for a period of five to eight years after maturity.

The unripe fruit resembles a banana in shape but is no thicker than a fountain pen. The pods are from five to ten inches long and are of a blunt triangular shape. They are not allowed to ripen on the vines but are gathered green when the tree tips begin to turn yellow. The unripe fruit has no flavor or odor, these characteristics being developed as the result of changes which take place in the fruit during the curing process.

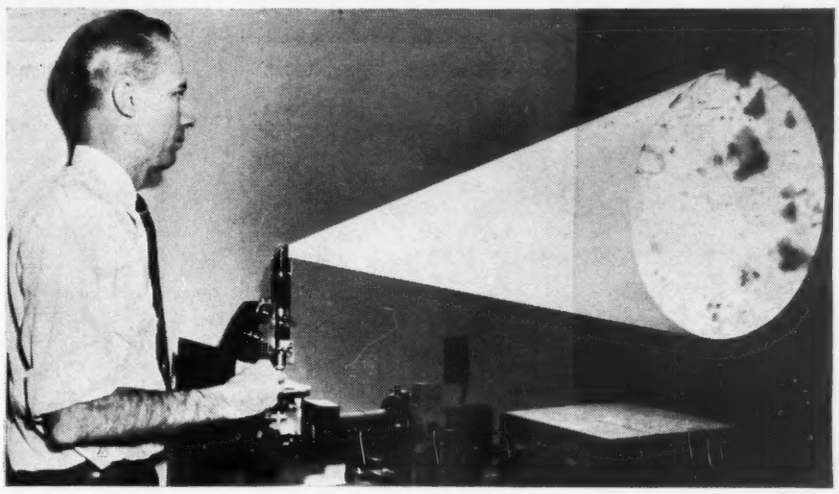
The chemical substance from which vanillin (the principle flavoring constituent of vanilla) is formed, occurs in the ripening uncured fruit in the form of a glucoside called glucovanillin. During the curing process, this glucoside is hydrolyzed to vanillin and glucose by the action of an enzyme in the nature of a betaglucosidase. The vanilla aroma and flavor is due in part to the hydrolysis of glucosides other than glucovanillin and to small quantities of volatile oil, which in the Bourbon vanilla consists in part of esters of cinnamic acid.



PASSAGE of light through polarizing microscope is illustrated in diagram.



MICROSCOPE is used for the direct examination of ingredients in prepared baking mixes (above). It can be used also for micro-photographic projection (below).



Polarizing Microscope — A Quality Control Instrument

Presence or absence of various ingredients in prepared baking mixes now can be quickly determined both qualitatively and quantitatively

By RUSSELL N. BELL, Research Laboratory, Victor Chemical Works, Chicago Heights, Ill.

POLARIZING microscopes are effective aids in quality control in that they: (1) Make possible quick identification of ingredient materials for which methods of analysis are not readily available, (2) provide improved means for confirming presence or absence of ingredients in mixes for which analytical methods are available, (3) are invaluable when quantity of sample is limited or when analytical methods require large samples to determine absence of ingredients or presence in small amounts and (4) eliminate the factor of variability in appearance resulting from differences in manufacturing practices.

Although the microscope is primarily a qualitative instrument, it can be highly quantitative. An experienced operator can usually make reasonably close estimates of the percentages of various ingredients present in a mix. This performance is especially true in control work. Any serious deviation from the normal appearance of the mix is usually quickly apparent when microscopic examination becomes a routine procedure. When the microscope is used as a control instrument, it usually requires only a few minutes in which to make certain that all ingredients have been added, and to get an idea of the amount of each in a mix.

Inorganic Salts Are Identified by Their Crystalline Shape

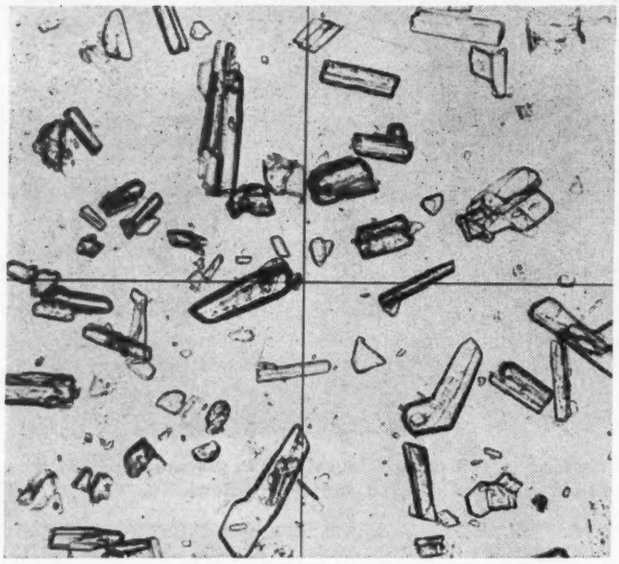


FIG. 1. Sodium bicarbonate in transmitted light. (Mag. 100x).

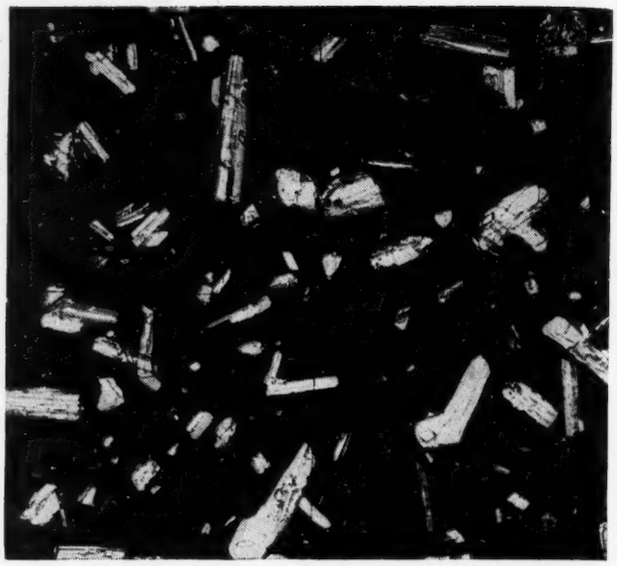


FIG. 2. Sodium bicarb between "crossed Nicols". (Mag. 100x).

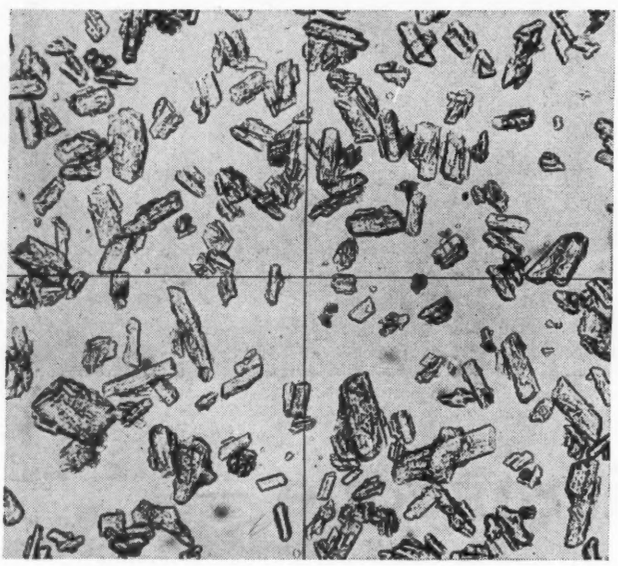


FIG. 3. Mono-calcium phosphate, transmitted light. (Max. 100x).

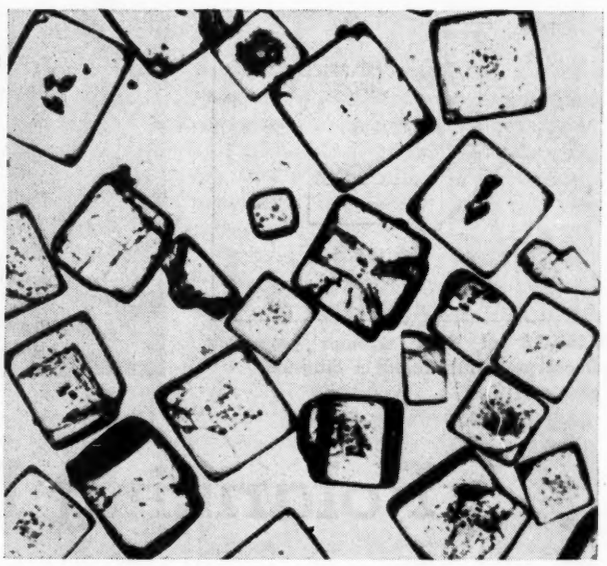


FIG. 4. Sodium chloride in transmitted light. (Mag. 44x).

In this respect, the polarizing microscope is relatively accurate, quite versatile in application and economical in both time and sample when in the hands of an experienced microscopist. It is particularly effective for the examination of prepared cereal mixtures such as prepared baking mixes.

These prepared baking mixes are becoming increasingly popular and, although they simplify the housewife's tasks, they do not simplify the work of the analyst or that of the quality control technologist.

Since the quality of a mix depends upon correct formulation, baking tests are frequently used as control tests on the finished product. The baking test, however, is deficient. It does not necessarily locate the source of trouble when quality is not standard. Yet the baking test does serve as a check on the overall quality of the product. The microscope has proved useful in detecting errors in mixing, when used to supplement analytical and baking tests.

The ingredients usually present in a mix can be identified with the polarizing microscope. And, if one of the ingredients has been omitted, the absence is readily apparent. Also, in the role of a control instrument, the microscope offers a means of determining qualitatively those ingredients for which analytical methods are not available or practical.

Design of Microscope

In its construction or design, the polarizing microscope is similar to the ordinary biological microscope, except that it has two polarizing prisms called "Nicols", one below and the other above the stage. The one below is always in the light path, but it alone does not produce any visible change in the transmitted light. The upper prism can be withdrawn from the light path to cause the objects viewed to appear the same as when the ordinary microscope is used. They are said to be viewed in transmitted light. When the upper polarizing prism is inserted into the path of the light the object is said to be viewed between "crossed Nicols", because the polarizing prisms are normally in the crossed position. In this position no light is transmitted unless a crystal, fiber or grain which has some effect on the light is placed in the field on the stage of the microscope. The background, therefore, is black while most crystalline materials and starches appear bright. Many crystalline products exhibit brilliant

"Crossed Nicols" Are Useful For Distinguishing Sugars

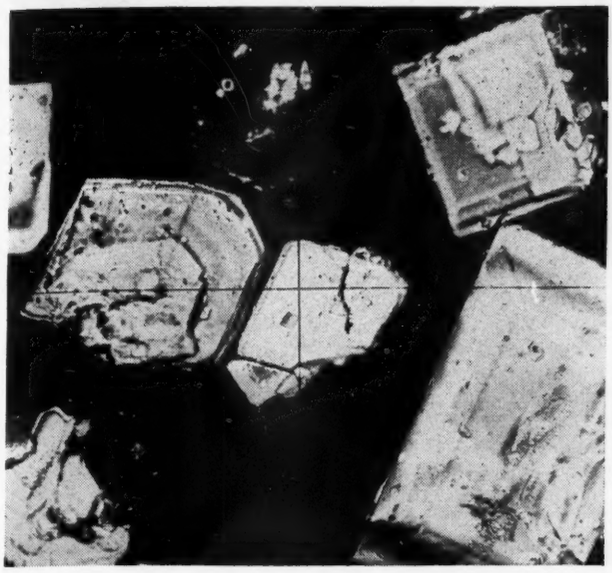


FIG. 5. Cane sugar between "crossed Nicols". (Mag. 100x).

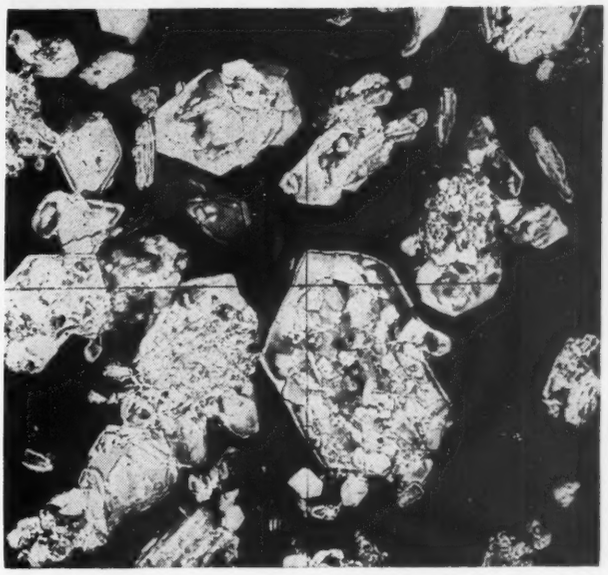


FIG. 6. Corn sugar between "crossed Nicols". (Mag. 100x).

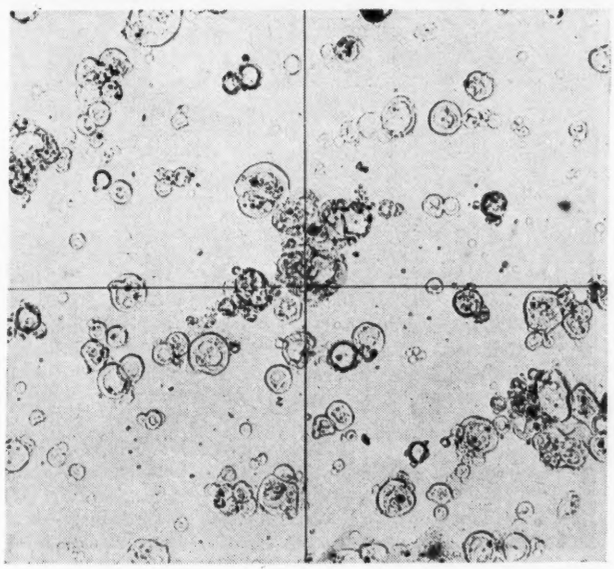


FIG. 7. Dried egg examined in transmitted light. (Mag. 100x).

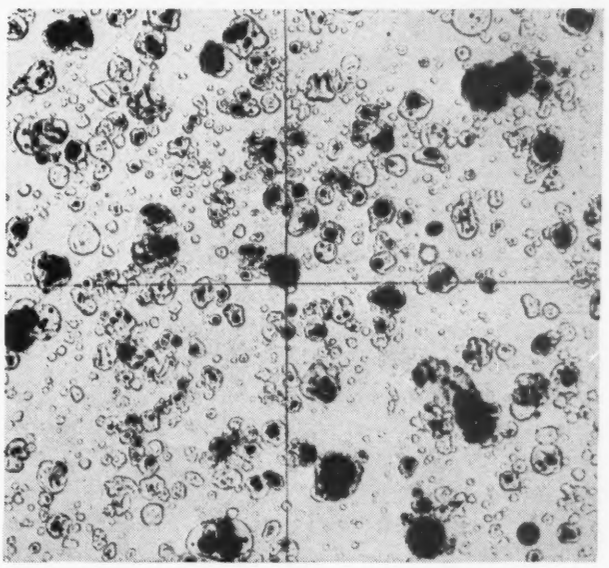


FIG. 8. Dried milk examined in transmitted light. (Mag. 100x).

colors when viewed between "crossed Nicols".

When prepared cereal mixtures are examined, the sample is mounted in clove oil and examined in transmitted light and between "crossed Nicols". Clove oil is used because its refractive index is close to that of most flours and starches. It renders them less visible and makes most of the other ingredients stand out more clearly.

The leavening ingredients can usually be identified by observation in transmitted light as can salt, dried egg, dried milk and cane sugar. The flours are most readily recognized when viewed between "crossed Nicols". Corn sugar is also more apparent between "crossed Nicols" because its refractive indices are too close to that of clove oil to make it stand out plainly in transmitted light. Most of the other ingredients have a characteristic appearance between "crossed Nicols" so that this appearance usually serves a check on the observations made in transmitted light.

Detecting Crystalline Material

Usually, the percentages of the crystalline materials added to flour are quite low. To obtain a higher concentration of them, the product is centrifuged in carbon tetrachloride to separate the heavy inorganic crystalline ingredients from the flour, egg, milk and shortening. The lighter materials are decanted with the carbon tetrachloride, and the crystalline fraction is allowed to dry at room temperature and then mounted in clove oil for examination. This procedure gives a much higher concentration of the leavening agents, inorganic enrichment compounds and other crystalline ingredients. It makes possible the detection of trace materials which may be present. These separated crystals are frequently mounted in other index media for refractive index measurements to identify or to verify the identity of one or more of them.

Photomicrographs

Space will not be given to a complete description of each of the ingredients likely to be found in prepared baking mixtures. However, photo-micrographs will indicate the appearance of some of them when viewed through a polarizing microscope. These photo-micrographs were taken of the respective materials mounted in liquids whose refractive indexes are sufficiently different from the ingredients to make their shapes

Flours Used in Prepared Mixes Show Characteristic Forms

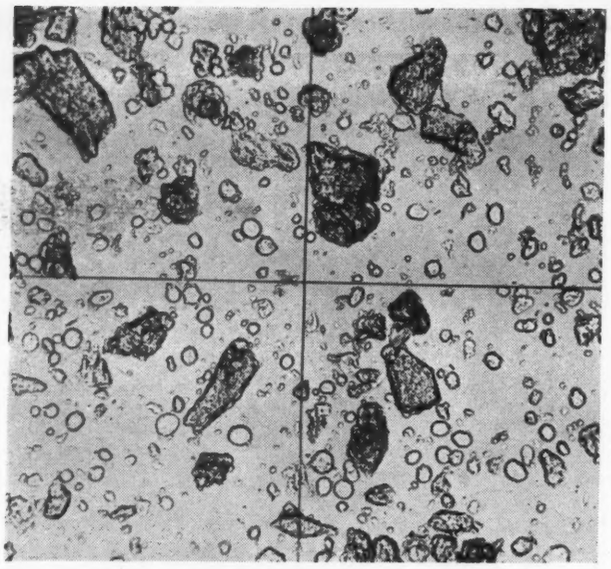


FIG. 9. Soft wheat flour in transmitted light. (Mag. 100x).

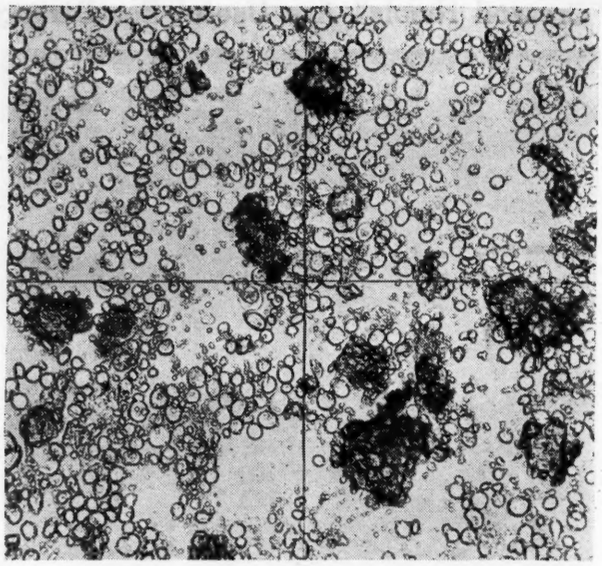


FIG. 10. Hard wheat flour in transmitted light. (Mag. 100x).

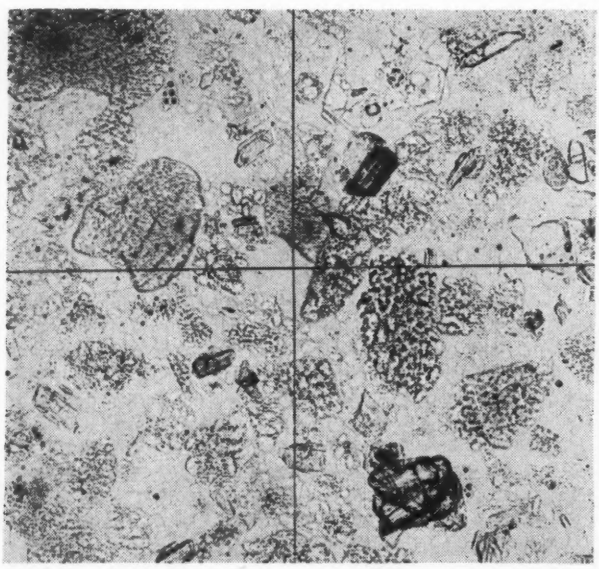


FIG. 11. Prepared pancake flour in transmitted light. (Mag. 100x).

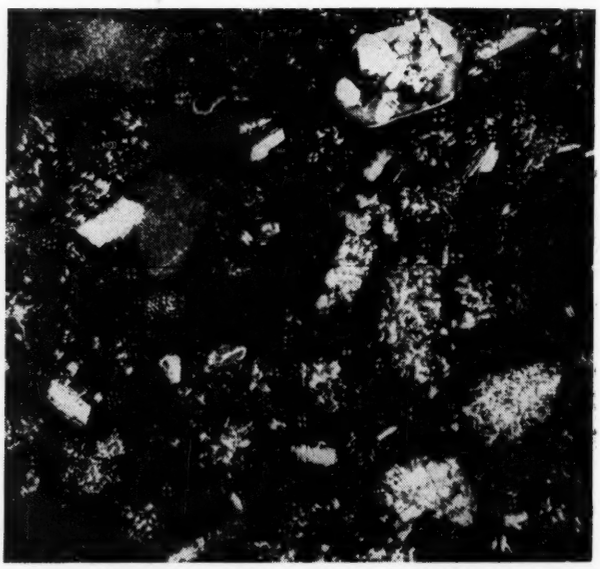


FIG. 12. Pancake flour between "crossed Nicols". (Mag. 100x).

readily apparent under examination.

Sodium bicarbonate, as shown in Figs. 1 and 2, is distinctly crystalline and is readily recognizable in either transmitted light or between "crossed Nicols". The mono-calcium phosphate, shown in Fig. 3, is as anhydrous crystals which are frequently found in prepared mixes. The hydrated mono-calcium phosphates vary considerably in appearance, depending on the process of manufacture. Fig. 4 shows cube salt magnified 44 diameters. Flake salt is also quite common and its cubic structure usually is apparent, although the flake is irregular in shape.

Cane and corn sugars, as shown between "crossed Nicols" in Figs. 5 and 6, are readily recognized and easily distinguished from one another by shape as well as by the colors exhibited when viewed between "crossed Nicols". Spray dried egg, Fig. 7, and spray dried milk, Fig. 8, are usually identified in transmitted light, as is powdered shortening.

Many of the flours used are characteristic enough in appearance to make identification possible even when several are mixed together, Corn, wheat, rice, buckwheat and soya flours are frequently used and all can be identified. It is even possible to distinguish between soft and hard wheat flours, which are shown in Figs. 9 and 10.

With the exception of the photomicrograph of salt, which is magnified 44 times, the magnification is the same for all of the products shown, 100. Although these photomicrographs do not show all of the variations in appearance for each product, they are typical of materials which are being used commercially, and they serve to illustrate how these ingredients can be detected in prepared mixes.

The last two photo-micrographs show a prepared pancake flour mounted in clove oil, as it appears in transmitted light, Fig. 11, and between "crossed Nicols", Fig. 12. Both photomicrographs show the same field so that the appearance of each crystal or grain in transmitted light can be compared to its appearance between "crossed Nicols".

A microscopist who is experienced in prepared cereal mixtures can pick out sodium bicarbonate, anhydrous mono-calcium phosphate, salt, corn sugar, spray dried milk and corn, wheat and rice flours. He can also make a reasonably accurate quantitative determination of their percentages in the mixtures.

EDITORIALS

COMMENT AND OPINIONS

Progressive Processing

WE recently had the good fortune to be shown through the plants of a leading canning company which has accomplished the difficult feat of keeping sales price increases relatively low while paying the greatly increased costs of labor and raw materials. We were curious as to how they had done this. As we had guessed, it was a matter of increasing processing efficiency rather than any sacrifice in quality.

While we can't tell you here of the many improvements, we can mention the philosophy and overall approach. The company executives and operating men realized that there was much room for improvement in most food processing operations. So a group was set up to study each step and each machine in every production line. Much has been done to save labor and to improve quality. Much more is expected, including a revolutionary new process.

This procedure pays much greater dividends than complaining about uncontrollable costs, which may go even higher as labor gets its fourth-round of wage increases.

Universities Are Useful

HIGH costs and taxes permitting, food processors interested in technological progress in their company and their industry would do well to lend financial support to the food research activities of the colleges and universities in their part of the country. The combined research facilities and scientific knowledge available in a university can be utilized at relatively low cost. So if you have a research problem which you are not equipped to tackle, you can't lose anything by discussing it with the head of the bacteriological, nutritional, chemical or engineering laboratory at your favorite school which specializes in food technology or engineering.

By the same token, food processors should take a cooperative attitude toward university researchers who need to run a test in plant, or pilot-plant, equipment.

The work of the Nutrition Foundation, financed without individual advantage by several food manufacturers, has demonstrated that progress can be purchased cheaply through the colleges and universities.

More Chemurgy Needed

SEVERAL grains now are in surplus supply. Other agricultural commodities are likely to be available in quantities greater than the current need within a few years. Thus we work our way back toward the conditions that prevailed during the 1930's. Then almost all basic farm and range products were in surplus.

All this has an important meaning for many food establishments which are not as yet affected by a potential surplus of raw material. Almost every division of the food business can profit to some extent from a study of non-food products which may be made from the primary output of agriculture. Many of the new end products are byproducts. Others would be strictly co-products. All of them deserve more attention than they have had during the last ten years, when scarcity rather than surplus has been the general situation.

A considerable amount of research and development work usually is needed before a firm can successfully and profitably enter such activity. The route is neither obvious nor easy. But any company of substantial size which fails to survey these possibilities may be missing an important profit opportunity.

Chance for Distinction

LESS than a month remains in which to bid for the honor of having the outstanding new process in the food industries. All entries in the 1949 Food Industries Award competition must be in by January 1, 1949.

The award will go to the company in the food industry which—in the opinion of a jury appointed by the Institute of Food Technologists— has made the most outstanding achievement in food technology. Dr. S. C. Prescott, first IFT president, heads this committee.

To be eligible, a process shall have been put into commercial operation subsequent to V-E Day (May 8, 1945). Nominations for an award may be made by anyone, including employees of the company concerned. The Award will be presented to the winning company at the annual meeting of the IFT in San Francisco.

There are many advantages in winning such an award. Probably the biggest is in the pride which your employees will take in working for a company that is out in front. In this case, pride often goes before better performance on the job and higher praise for the company off the job. And it is easier for a company that is "going places" to hire high-caliber personnel.

You can enter the Award competition by expressing your intent in a letter to the Executive Editor of Food Industries, who is acting as secretary of the Award Jury. You must send along, of course, information about your process. This will be passed on to members of the Award Jury. Your presentation should include a technical description of the process, together with an explanation of how the process came to be developed, the steps by which it was developed, and the success—technologic or economic—which it has achieved (see F.I., July, page 92 for details).

Remember, January 1 is the deadline!

High Cost of Shipping

ONLY a few months ago, the railroads of the country were granted a freight-rate increase of nearly 25 percent. Early in October they asked for an additional 8 percent raise. And before the month was out, they changed the request to 13 percent. Thus the food industries of America again are confronted with a new financial burden for transportation.

Already the railroads' charge for movement of food, raw materials and finished manufactured foods represents a very substantial part of the total of foodstuffs bought by housewives. If this portion of the retail price is increased again, it will contribute further to the direct cost of living.

It is most difficult for food technology entirely to offset these new costs. So management must study alternate methods of transport. Also deserving attention are alternate systems of packaging which may lower the weight of freight per unit of foodstuff sold.

Already our industries are among the largest users of truck haulage. Perhaps we should use more. Certainly we will have new inducement as rail freight rates rise.

Even if I.C.C. does not grant further increases, we still must seek a lesser packaging weight. Many of our foods in the freight car or the truck are more than twice as heavy as the product inside the package. If we can take off some of the packaging poundage without making the containers fragile, we can do something to lower the cost of movement. At no previous time have we had such great inducement to do this.

How a Swede Sees It

FROM a Swedish food manufacturer have come words of wisdom that ought to be heeded by every maker and enforcer of laws and regulations that affect industry in every democratic country. And there being more manufacturers of food than of any other product in this country, who is better qualified to bring such thinking to the attention of the American legislators and enforcement agencies?

The Swedish manufacturer to whom we refer is Mr. Henning Throne-Holst, chairman of Marabou and Findus, Stockholm chocolate makers and canners. These are his sentiments:

"Our times make increasing demands on private enterprises, and their freedom is ever more curtailed by laws, regulations and considerations. This is, of course, partly governed by the altered requirements of commercial and industrial life. But often entirely new demands are made on industry without, as far as one can understand, any other thought being given to their reasonableness or to industry's ability to fulfill them, except that the future and coming experience will supply the answer.

"No thought seems to be given to the fact that any ensuing damage to the progressive and competitive spirit in industrial life may well be irremediable. One might question why, with the flood of investigations now set in motion, no effort is made to establish what is the most important prerequisite for the preservation and development of private enterprise's progressive efforts, and to what extent the freedom of movement of business can be curtailed without damaging its central nerve."

To those remarks, one need but say "Amen."

Objective Testing Method

ANY specification is improved if it can include a quantitative measurement to determine compliance. With many foods this is difficult. But the need is so great that serious effort should always continue in the hope of reaching this important end.

Recently at a number of institutions, new efforts have been made which include work on the more difficult commodities, fresh fruits and vegetables. Some of the State Experiment Stations have been working on these problems, notably the Maryland Station at College Park. Substantial progress is being made in a number of instances on peas, corn, and even the most difficult items like asparagus.

Many divisions of the food business have apparently not made a sufficiently zealous effort toward getting the standards and the testing methods in the best quantitative form. In a number of instances both purchases and sales are poorly guided. Operating executives as well as the research department should look into these problems. Delay is peculiarly inexcusable when there are recognized methods established by good practice which are not being used as much as they should be.

We wonder when this development of quantitative objective tests may go far enough even to tell us how many "grits" to the pound there are in cleaned spinach.

Goal For Freezers

AMBITION, they say, is the forerunner of success. And if that were all that were needed, the frozen food industry would be in for a tremendous boom. The Frozen Food Foundation believes that the consumption of frozen foods can be increased from $5 to $200 annually per family. That is a worthy goal, and certainly not an impossible one in the long run. But, of course, other food processors who compete with the freezers will have quite a say in respect to how much of the food budget is spent for what.

Consumer education—as to the advantages and values of frozen foods—is the way to increase frozen food consumption, the Foundation believes. And the advertising of freezers should be of the broad, informative type rather than the individual-item type.

Well, the Foundation has something there. And it goes further to say that the quality of frozen foods must be consistently good. This latter point cannot be emphasized too strongly. Being entirely dependent for success upon repeat sales week-in and week-out, the food processor cannot build business on consumer education alone.

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters

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®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

- No oil filters.
- No dust filters.
- No internal lubrication to contaminate air handled.
- No internal wearing parts.
- No valves, pistons, or vanes.
- Non-pulsating pressure.
- Original performance constant over a long pump life.
- Low maintenance cost.

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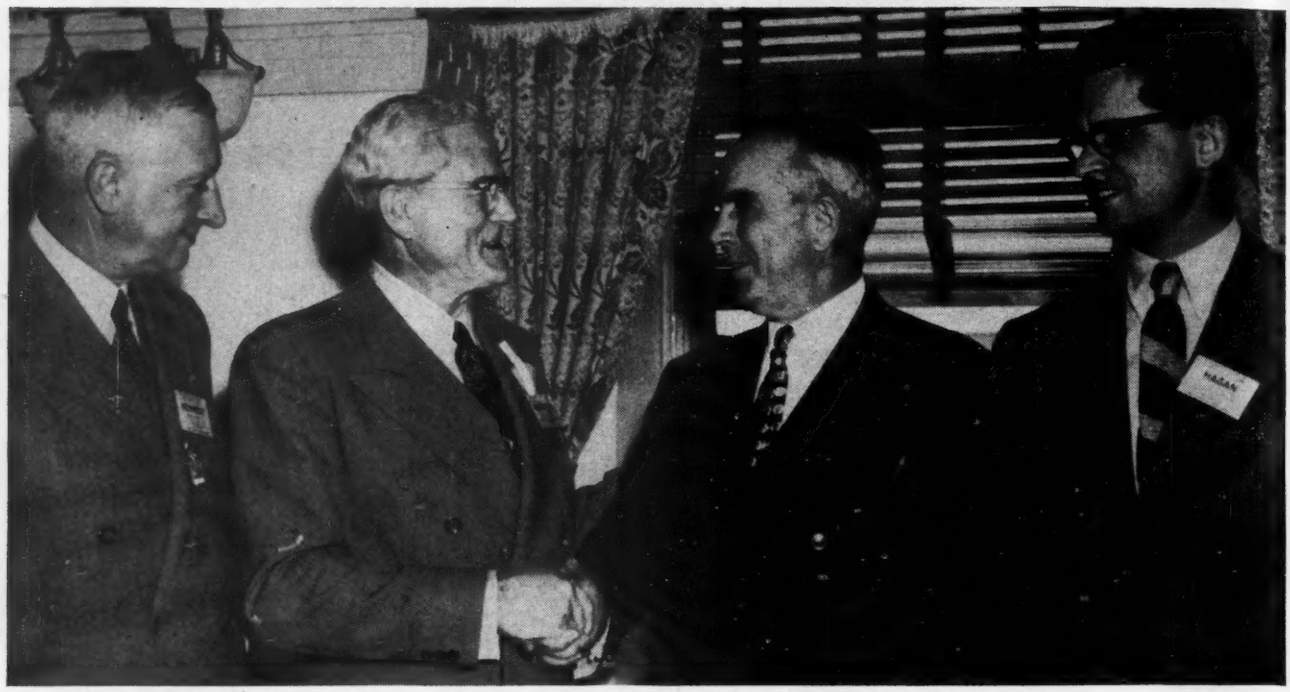
CONVENTION REPORTS



C. Stanley McKenzie, new IAICM president (2nd from left) is congratulated by Executive Secretary Robert C. Hibben, at Atlantic City convention, while Vice-president Ridgeway Kennedy, Philadelphia (extreme left) and Treasurer I. N. Hagen, Uniontown, Pa. look on.

Ice Cream Makers Urge Closer Attention to Quality

Decline in sales over past two years is attributed to indifference in both manufacturing and selling

DECREASING sales of ice cream and reduced production of milk were subjects highlighted at the 44th annual convention of the International Association of Ice Cream Manufacturers, in Atlantic City, the last week of October.

Referring to the decline in ice cream sales since 1946, which he said was an abnormal year, Benjamin C. Brown of New Orleans, IAICM president, said: "For a quick diagnosis, I would reach the conclusion that in the past two years the slump in sales has been the result of lassitude and indifference of the industry to the maintenance of high quality products."

Mr. Brown called upon the nation's ice cream business not to put its efforts into a competitive struggle within the industry, but to compete with other products that seek the same share of the American food dollar. "I believe that, in our selling and promotional work, too many of us are chasing a 'will-o'-the-wisp,' President Brown told the manufacturers. "Too many of us believe that our competition is the 'brand name' ice cream in our neighborhood."

He also noted that the industry has not done a good job of selling its products to the public. Also, too many ice cream dealers are not informed of the ingredients and the food value of their product. Americans know ice cream is delicious, and manufacturers make a mistake in advertising the taste of the product when emphasis on the food value would result in more sales.

Following the same trend of thought, M. G. Van Buskirk, executive secretary, Illinois Dairy Products Association, told the IAICM that the greatest obstacles to increasing sales of ice cream, and to an attendant increase in profits, lies in the lack of uniformly good quality. "Too often profit is placed first in our thinking," Van Buskirk said. "It should be second. Quality first will produce profit. Profit first is the reverse order and will produce reverse results."

Speaking on the subject, "Safeguard Your Market", Elmer J. Mather, vice-president, National Dairy Products Corp., told the manufacturers that the industry must take immediate action. "The price of ice cream has risen to a point where less ice cream is being sold," he said. "Costs must be cut, not by reduction of fat or flavor, nor by increasing the overrun, but by increasing the volume of business."

"At the present time," Mather said, "retail prices are too high, dippers used are too small, and many dealers are buying cheaper bulk ice cream for fountain use." To increase volume, the contact salesman should sell the dealer on the fact that the best price for ice cream is the one that will sell the most—he should be interested in profit dollars instead of profit percentages.

Mr. Mather pointed out that, on an average, the turnover of packaged ice cream was 52 times annually and fountain ice cream was 78 times. By way of comparison, he stated that the average drug store item turned over only three times per year.

Noting that the 1948 per capita consumption of ice cream is approximately 3 gal., compared with the 1946 figure of 3.6 gal., W. A. Wentworth, The Borden Co., New York, stated: "Although a good record has been made in the past in per capita consumption compared with other foods, we are not doing so well with getting consumers to pay what dairy products are worth

or "the" price that will maintain the supply of milk."

Mr. Wentworth said that the nation's cow population has been reduced 2,800,000 in the past four years because of American demand for meat. He said, however, milk output has not decreased as much as milk cow numbers, and estimated that the 1948 production would be about 1,000,000,000 lb. below that of 1944, year of highest dairy cattle population."

In addition to the questions of price and volume, the sessions touched upon every phase of the ice cream business—merchandising, production and laboratory, and costs. Work simplification and employee relations were the subject of several talks. At the fourth general session, Allan H. Mogensen, Work Simplification Conference, Lake Placid, N. Y., spoke on "Plant Procedures to Build Profits." In order to build profits, he said, productivity, not production, should be increased. He emphasized the value of accomplishing as much as possible with existing equipment and personnel. Workmen should be educated, Mr. Mogensen said, in the economic facts of life, and incentives other than financial should be provided.

"Work Simplification in Action" was the subject of a talk by Harold G. Dunlap, H. P. Hood & Sons, Boston, given at the Wednesday afternoon Production & Laboratory Council. With the aid of moving pictures showing the old and the new methods, Mr. Dunlap explained how a number of operations in his company's ice cream plants had been improved by work simplification. The improved methods greatly increased labor productivity while reducing fatigue.

Equipment Exhibit

In addition to the IAICM convention, the 16th Dairy Industries Exposition showed new displays of the 350 American and Canadian exhibitors, which completely covered two floors of the huge convention hall. According to Ray E. Olson, president, Dairy Industry Supply Association, "more men probably worked longer hours putting together this display . . . than ever before worked to assemble a Dairy Industries Convention."

Gleaming bicycle-propelled ice cream carts, soda fountains, refrigerators and delivery trucks vied for attention with milk heaters, evaporators, bottle and can washers, filling and capping machines, freezers, pumps and hundreds of other items such as milk and ice cream containers, cones, flavors, stabilizers and emulsifiers.

One of the largest pieces of equipment on display was a double-effect evaporator, one section of which is 24 ft. tall. The manufacturers claim this evaporator can handle the daily production of 17,000 cows.

Technical experts said that they considered the widespread use of stainless steel and automatic processes a major step toward still greater sanitation.

For the Small Operator

A definite trend was noted toward making available to small and medium-sized dairy and ice cream plants the labor-saving and efficiency processing and handling methods previously utilized only in large plants. Modern refrigeration methods yielding sub-zero temperatures with machines half the size of previous models, and semi-automatic ice cream packaging equipment, are examples of this trend.

Two graduate research fellowships totaling $1,700 were presented to the Iowa State College team, grand winner, and Ohio State University, runner-up, in the all-products judging contest. The Iowa team also carried away silver cups for both butter and market milk. Cups also went to the Michigan State College team for cheese and to the University of Tennessee for ice cream.

New Officers

At the fourth general session of the IAICM, G. Stanley McKenzie of Los Angeles, Cal., was elected president, succeeding Benjamin C. Brown of New Orleans. Ridgeway Kennedy, Jr., of Abbotts Dairies, Inc., Philadelphia, was elected vice-president, and I. N. Hagan, I. N. Hagan Ice Cream Co., Uniontown, Pa., was elected treasurer.

SHOP-TALKING AT ABI

Baking's present and future appear to look fairly bright to Carl Pickering (left), Mrs. Conkling's Bakery, San Diego; E. Franz, United States Bakeries, Portland, Ore.; Albert Gordon, Gordon Bread Co., Los Angeles; and Walter Warrick, Short Milling Co., Chicago. They met during the ABI meeting in Chicago.

Bakers Expand Promotion

Program, charted through 1953, is cited as one of several methods of combatting rising costs and dwindling profits

UNDER the slogan of "Tomorrow-Unlimited," the American Bakers Association staged its annual meeting in Chicago, Nov. 4 to 6, and discussed industry plans for the immediate and long range future. Chief subject was ways and means of combatting continued rising costs and shrinking profits.

A significant action was the proposed expansion of the Baking Industry Promotional Program. It is to continue at an increasing intensity through 1953, at least. This program, originally started in 1946, to provide $1,500,000 for a total of three years, now calls for an expenditure of $750,000 in 1949, $1,500,000 per year in 1950, 1951 and 1952, and probably an increased amount in 1953.

The proposal was received by the 1250 members of the industry attending the meeting with enthusiasm that resulted in an oversubscription of the 1946-48 program by $100,000.

This promotion program is to supplement the millions of dollars spent annually by individual baking companies

for their trade-mark advertising and sales promotion. The expanded program is to include increased support of the American Institute of Baking, which carries on scientific research work for the baking industry and conducts a training school for young prospective bakers.

A major portion of the program will continue to be devoted to promoting consumer interest in bakery products by consumer education, field merchandising services for individual bakers, and assistance in planning advertising campaigns.

H. W. Linmaster, chairman of the association and president of Linmaster Baking Co., Duluth, Minn., cited two convincing economic reasons for the expanded program. In the first place, he said, recent industry surveys show extensive untapped markets for enriched bread and other bakery products. And then, individual bakers are operating dangerously near the "break-even" point because of continued efforts to hold down the retail selling price of bread and sweet goods in the face of continuing increase in production expense.

He stated that the sale price of enriched bread has increased only 63 percent over the 1935-39 base period. Bureau of Labor Statistics report an average increase of 116.8 percent for all foods during the same period. He cited increased costs since 1939 of 80 to 90 percent for labor, of 75 to 100 percent for building and equipment, and of 153 percent for four major ingredients.

As evidence that bakery products have increased in nutritional value since 1939, Hugh L. Cook, agricultural economist, University of Wisconsin, made a progress report on a survey on use of milk in bakery products. The survey is a joint project by the University of Wisconsin and U. S. Bureau of Agricultural Economics with funds authorized by the Research & Marketing Act. It was revealed that bakers are using more milk per 100 lb. of flour used and that most bakers are selling more bakery products than they did in 1939.

The percent of increase in milk used depends upon the consumer preferences in various markets, availability of a desired quantity of milk, and the price of milk in relation to retail selling price for the bakery products. Non-fat dry milk solids in white bread were found to vary from 1 lb. to 8 lb. per 100 lb. of flour used. Forty-four percent of the baking companies report use of dried milks only, and 49 percent report only part of their milk used as dried milk.

Morris Sayre, president, National Association of Manufacturers, speaking on "Tomorrow Unlimited—If We Work for It", stated that increased taxes since 1930 have prevented plowing back of national production income to such an extent that industry today is $185,000,000,000 short in new plants, new machines, new tools and new processes—the factors needed to provide more and better products at lower and lower prices.

He made a plea that inflation be answered by increased productivity through investment of capital, which would provide more efficient machines and tools and permit effective use of improved processes.

Training of personnel, merchandising, distribution and delivery problems, sales accounting, ingredient supplies, and consumer markets were emphasized in the several sessions for the wholesale bread, wholesale cake, wholesale pie, house-to-house and retail branches of ABA.

Announcement was made of an equipment exhibit to be held in Atlantic City, N. J., in 1949.

Study Use of Yeast in Foods

Symposium discusses primary grown and brewery by-product yeasts and utilization of carbohydrate in wastes

WIDESPREAD interest in the potential food uses of yeast was evident at the symposium on "Yeasts in Feeding" held last month in Milwaukee under the sponsorship of the Associates of the Food and Container Institute, the Brewers Yeast Council, and the QM Food and Container Institute for the Armed Forces. The symposium was attended by a representative group of more than 250 that included research directors, food technologists and nutritionists.

Emphasis was put on primary grown and brewery by-product yeasts of the *Saccharomyces cerevisiae* species and on *Torulopsis utilis* for utilization of industrial wastes containing fermentable carbohydrates. Some attention was given to other less commercially known species, which may show greater promise for industrial growing.

On the program were 27 review papers that summarized existing knowledge on yeast culturing, propagation, recovery, composition, biology, physiology, and the use in human, animal and poultry feeding. Along with the sessions a production plant trip was arranged.

Looks Back

In his address of welcome, Lt. Col. Joseph S. Kujawski, commanding officer, QM Food and Container Institute, likened the meeting to a momentary pause in a military operation to permit a backward glance, collection of data, consolidation of gains based on well considered facts, and charting of a course for the future. In this instance the pause was to evaluate available information on nutritional yeasts and to stimulate inquiry and the initiation of research on what is not now known about yeasts and their potential food uses, all with a view to greater utilization of our national resources.

To start the presentations, Dr. M. A. Joslyn, head of the Food Technology Division, University of California, outlined the relationship between basic investigations on yeast and the production and use of yeast. He cited the wide use of the various strains of *Saccharomyces cerevisiae* by bakers, brewers and yeast growers, which is due to their availability, rapid growth under fairly accurately controlled conditions and the similarity of their cellular physiology to that of animals.

Other Species

Mention was made of other species such as *Endomyces vernalis and Oospora Wallroth,* for high fat formation; *Torulopsis utilis,* for high protein synthesis from cheap carbohydrate; *Ashbya gossypii* for high riboflavin synthesis; and *Candida albicans, Brettanomyces* species *and Zygosaccharomyces* species for carbohydrates assimilation and utilization.

Emphasis was put on the conditions under which yeasts convert carbohydrates into fats and other lipids, convert carbohydrates and ammonium salts to proteins, synthesize vitamins and propagate to develop a desirable food material.

The carbohydrates grown on one acre can be converted into 840 lb. of yeast protein as compared with 70 lb. of animal protein, it was stated.

The industrial importance of dried brewers yeast alone is shown by the 12- to 15,000,000 lb. now recovered, although there is a possible total of about 45,000,000 lb. of surplus yeast. This tonnage results from a four to six fold growth of yeast cells during fermentation of wort to make beer or ale and amounts to about one-half pound of dry yeast solids per barrel of beer and ale made. Higher yields and nutritive values are obtainable when yeast is grown primarily for feeding uses.

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NEW PACKAGES & PRODUCTS

Wilson & Co. Adopts Quick-Identity Labels

ATTENTION value has been emphasized by Wilson & Co., Chicago, in adopting a new brand identification for its products. Intended for "split-second" recognition of the firm's name in mass displays, the new label incorporates simplicity of design, legible type style, and warm color harmony.

A white "W" at the top of the label, superimposed on the company's standard orange background, replaces the older and traditional design of a blue bar on an orange "W". Black and white lettering predominates over white and orange backgrounds, adding clearness to the name and identity.

Potato Pancake Mix

NEW ADDITION to the line of grocery store products offered by the Rumford Chemical Works, Rumford, R. I., is a 4-oz. box of potato pancake mix. The mix is contained in a completely heat-sealed laminated glassine bag which affords protection against moisture and provides adequate shelf life. The contents of the bag are equivalent to 1¾ lb. of potatoes, so that, with the addition of one well beaten egg and 12 oz. of water, there is batter for 16 cakes.

"Permanized" Smoothness

A NEW TYPE peanut butter is being introduced under the Donald Duck trademark by Cinderella Foods, Dawson, Ga. Product is made according to a "permanized" process developed by the firm in conjunction with the Southern Research Institute. This process requires a very fine grind and the addition of dextrose to produce a smooth spread from which the oil does not separate. Exhaustive laboratory and field tests were made to insure uniform quality before the food was placed on the market. Brokers are being appointed for the area east of the Mississippi, and full distribution is expected by first of January.

New Frozen Food Line

QUICK FROZEN sliced strawberries and pineapple tidbits are among the many products under the private brand name of Fannaly's Fine Foods offered by Marion T. Fannaly, Inc., Ponchatoula, La.

The firm claims the distinction of operating the world's largest strawberry and shrimp freezing plants. The facilities can handle 1,000,000 lb. of the fruit daily and over 20,000 lb. of the crustaceans hourly.

A notable primary packer for the last ten years, the company has now extended its operations into broader fields with products under the new label. Future plans call for the processing of 25 to 40 assorted products.

Among the new frozen food specialties are: Peeled boiled shrimp, creole gumbo, oyster cocktail, oyster stew, shrimp a la creole, and hors d'oeuvres shrimp. These products are all quick frozen and packed in 6 or 10 oz. containers. Okra is also being frozen, and at a later date, brussels sprouts, broccoli, and other vegetable lines will be added. A new addition to the processing plant is now turning out blackberry, peach, strawberry and pineapple preserves in 1-lb. jars.

The founder of the firm, Marion T. Fannaly, started his career as a street vendor of peanuts. From this small beginning he developed the present business which has made him a factor in the frozen food field.

Half Chickens in Cans All Set For the Frying Pan

DISJOINTED, pre-cooked half chicken packed 2 lb. to the can is the latest poultry product distributed by the Bob White organization of Chicago. Each can contains eight large pieces of the fowl packed in rich broth. The chicken is ready to serve after a few minutes' browning in the frying pan.

The can's bright yellow and red label with black and white lettering carries a realistic picture of a pan of golden brown fried chicken. The label was styled by Norbert F. Schwartz, of Chicago, to carry out the familiar design of the items in the Pinafore line. Jackson Press printed the labels and Continental Can supplied the containers.

Test releases of the new product in important markets indicate popular consumer acceptance. Distribution is nationwide.

Handy Hostess Packs in Aluminum Foil Wrapping

NEW CRACKER SNACKS for that quick serving are the latest products offered by the Devonsheer Melba Corp., West New York, N. J. The American Hostess box has a total net weight of 10½ oz. and holds three aluminum foil bags which separately contain Cara-Trix (small crackers with caraway seeds), Idle Hour Cocktail Crackers (spice flavored chips), and Cele-Trix (crackers with celery seeds). The box is printed in red, yellow, and blue colors and is wrapped in Cellophane.

The Cinna-Mel package has a net wt. of 5 oz. and contains 20 squares of sandwiches of melba toast with a tasty middle layer made of cinnamon, sugar, starch and shortening. The box is lined with a sheet of aluminum foil.

Packages were designed by M. Weil of the Melba Corp.

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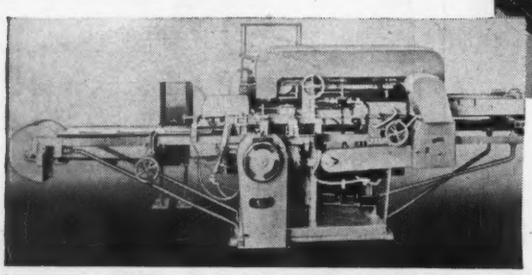

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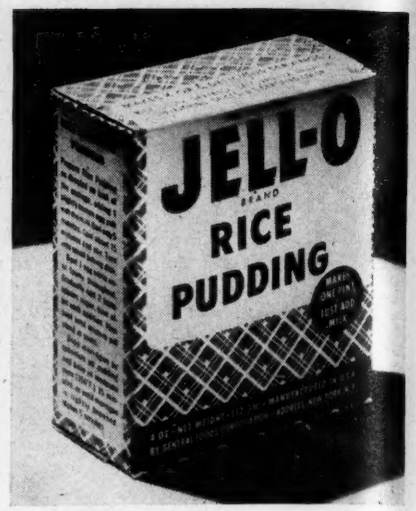


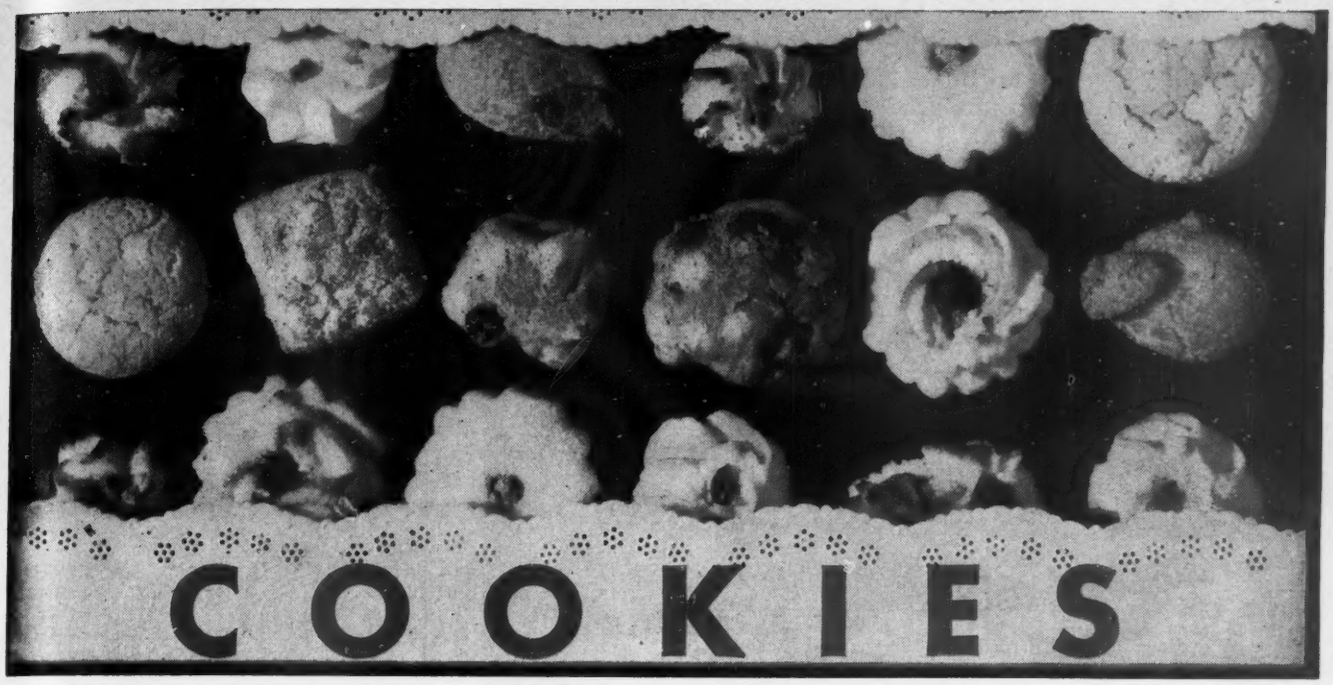
Quick Pudding Dessert

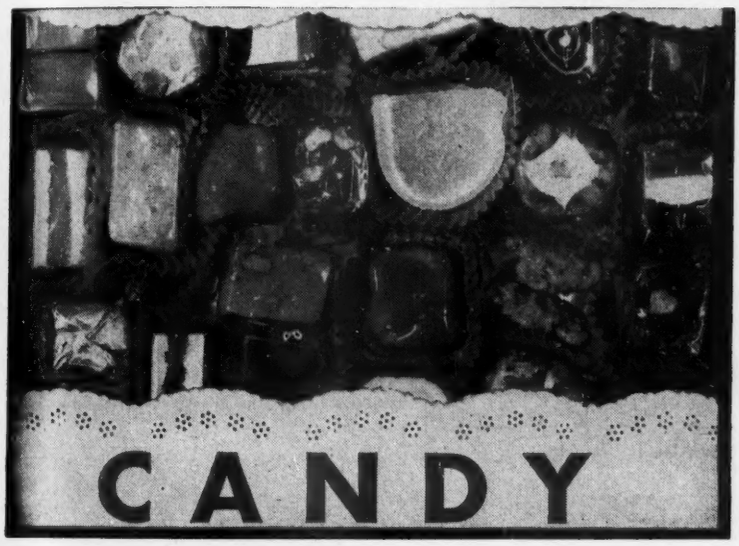
RICE PUDDING is the newest product to join the famous Jell-O family of the General Foods Corp. It is packed 4-oz. to the box. Basic recipe calls for the addition of milk and boiling for ten minutes to produce a rich, creamy dessert. Distribution is now being made in the east and central sections of the country.

Plastic Freezing Bags

TO MEET the consumer demand for satisfactory containers for storage of foods in refrigerators and freezer compartments, the Sydney-Thomas Corp., Cincinnati, has introduced a package containing seven large plastic bags made of polythene. A trademarked "See-Safe" closure, which shuts like a coffee bag, provides a leakproof, moisture-proof, vapor-proof, air tight container as insurance against dehydration and oxidation.

The unusual characteristics of the plastic make the bags odorless, tasteless, non-toxic, stain-proof, waterproof, washable and reusable. Re-





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French Mint Cakes

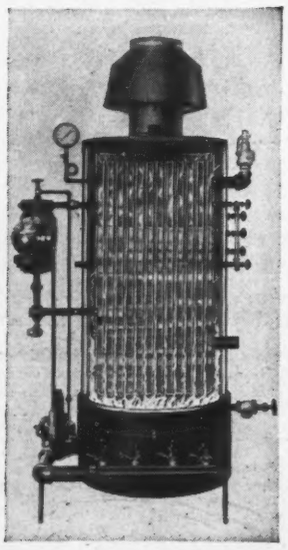
READY-TO-SERVE French mint cakes, under the label of La Ville Menthabas, are now being packed in cans by Maurice Bertauche, San Anselmo, Cal. Each tin contains four cakes. The product is made from cane sugar, flour, fresh eggs, milk, shortening, butter, pure peppermint flavor, salt and yeast. Produced according to the manufacturer's popular European style, the delicacies are offered as a companion dessert to Babas, the rum cakes which were successfully introduced in cans a few years ago.

New Canape Spread

MUSHROOM BUTTER is a new canned food product reported by the Can Manufacturers Institute. Primarily intended for canapes and sandwiches, the spread may also be served, after heating, as a steak sauce. Or it can be used as a base for mushroom soup.

Each can contains 5 oz. of the butter. Ingredients include ground mushrooms, milk, flour, oleo stock, mushroom essence, butter and salt.

EVERY UNIT AN "*individual*" UNIT



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FOOD INDUSTRY NEWS

Pickle Packers Push Research Leading to Quality Improvement

Influence of publicity program on heavy demand for pickle products is also cited at association's annual meeting

PRODUCT IMPROVEMENT through research, an intensive publicity program, and continuation of research work, were discussed at the National Pickle Packers Association's 56th annual meeting, in Chicago, Oct. 27.

Cautioning that the present buyer resistance to other "non-essential foods" might easily spread to pickle products, Leon S. Glaser, vice-president of NPPA, urged adoption of an intensive coordinated publicity program as he spoke to a record 175 members attending the meeting. He proposed a publicity program to supplement free newspaper and radio advertising, featuring merchandising stories to educate the buyer on the nutritional value of pickles and stressing their comparatively low price. Pickle prices have risen only 40 percent above prewar prices, compared to the 116 percent average increase in food prices, according to Glaser.

He noted the fact that this year's crop is 12 percent lower than the 1948 demand—the largest in history, due in part to increased publicity. And he stressed the necessity for raising prices in view of the increased harvest, transportation and container costs.

President Harry L. Conley opened the meeting by briefly reviewing present conditions and prospects in the industry. The finance committee presented a resolution—unanimously accepted—for the continuation of research. Assessment on manufacturers of ½c. per bushel based on intake and purchase, ¼c. per bushel for salters, and voluntary contributions from members, were proposed for the research project.

F. Olney Brown, chairman of the research committee, presided at the afternoon session, when reports were given on studies supported by NPPA. Dr. John L. Etchells, U. S. Agricultural Experimental Station, Raleigh, N. C., reviewed his research on brine yeast and its relation to pickle bloaters, illustrating his paper with colored slides. Dr. Ivan Jones and Albert A. Banadyga, North Carolina State College, reported on their seed research.

The statistical committee tabulated the 1948 pickle intake as 8,943,164 bu., compared with 10,746,316 bu. in 1947. The 12 month consumption was put at 10,190,604 bu., as compared with 9,198,280, in 1947, showing a continued increase of approximately 1,000,000 bu. in consumption in the face of a decrease in production. Total acreage in 1948, was 140,530.

Harry Conley, Green Bay Food Co., Green Bay, Wis., was re-elected president; Leon S. Glaser, Glaser Crandell Co., Chicago, vice-president; and E. G. Price, Libby, McNeill & Libby, Chicago, treasurer. L. W. Eastley, L. W. Eastley Co., Manawa, Wis., was elected a director, replacing W. C. Cook, Harbauer Co., Toledo. All other directors were re-elected.

Food Concerns Report Profit Ups and Downs

QUARTERLY financial reports showed a gain in the case of General Foods, and American Molasses Co., while net return fell off in the Best Foods, Beatrice Foods, and Standard Brands reports. Net earnings for General Foods in its third quarter were $6,534,434, as compared with $4,463,255 in the same three month period in 1947. Net sales for the quarter were $112,282,111, against $102,757,510 for the 1947 period. Net earnings for the nine months ended Sept. 30, were $20,431,995 on sales of $336,849,513, compared with a net of $12,599,146 on sales of $285,211,683 in the first nine months of last year.

American Molasses Co. showed a heavy gain for the three months ended Sept. 30, returning a consolidated net of $60,199 compared with $11,183 for the same period in 1947. Gross income for these periods was $571,419 and $481,450, respectively.

Best Foods Down

Net earnings of Best Foods, Inc., for their first quarter were $1,379,815, compared with $2,531,553 for the same 1947 period. Beatrice Foods Co., on the other hand, dropped only slightly for the quarter ended Aug. 31, showing $946,470 compared with $1,014,901 in the same quarter last year. Net sales were $54,761,586, as against $49,999,341.

Standard Brands, Inc., showed a net income of $787,520 for its third quarter, compared with $1,543,966 in the third quarter of 1947. The company showed a profit increase, however, for the first nine months of this year, reporting a net of $5,806,761 on sales of $214,034,858, as against a net of $5,378,503 on sales of $202,702,880 in the first three 1947 quarters.

AMA Directors

PRODUCTION and Marketing Administration, USDA, appointed two branch directors in recent weeks. Philip E. Nelson, former Wisconsin state senator, becomes director of the dairy branch, and Alvin V. McCormack, Idaho farm operator, takes over the Agricultural Conservation Programs branch.

British Combine

"PORTABLE GATHERING" OF HONEY

Following the honey flow by setting down his portable hives for only so long as the bees have plenty of blossoms to work on, this Australian apiarist has garnered a vast increase in yield. His mobile honey house can be seen between the trees.

Emergency Food Planning Left To USDA by Security Resources Board

THE USDA is at present the "food staff" of the National Security Resources Board, which is planning for war mobilization.

NSRB is the mobilization-planning agency set up by law to advise the President and to make and keep plans ready at all times for meeting the emergency of war, should it arise. NSRB has also advised the President as to what action he should take on current situations, such as deferment of scientists and technicians from the draft, and the need for allocations, now, of critically short materials.

In most of the divisions, NSRB has its own staff of experts—on manpower, metals, petroleum, etc.—but in the field of food and agriculture, the USDA has been given the whole job of (a) suggesting to NSRB officials what questions they should ask themselves about food mobilization, and then (b) coming up with some of the answers, too.

Head of NSRB's food division, and thus top man in the food mobilization field, is F. Chapin Weed, who was for many years an executive of the Grand Union Co., 500-store food chain. He has also been a food division official with WPB, a colonel in the Quartermaster Corps overseas and, most recently, an executive with Pratts Fresh Frozen Foods.

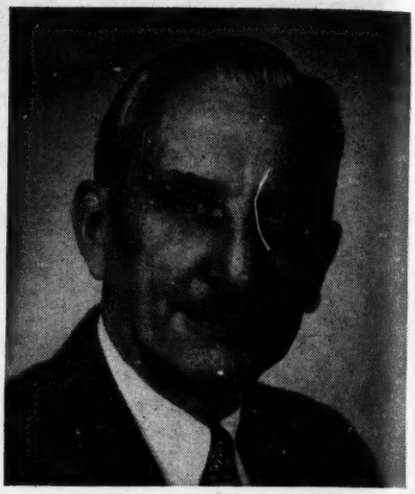
Reason for NSRB's farming out much of its staff work is this: Mobilization of agriculture involves problems vastly different from those that are common to production problems in mining, manufacturing, etc. Hence, while it is possible for NSRB to have a small but adequate staff of experts to deal with non-ferrous metals, for instance, or steel or petroleum—or even manpower—it is virtually impossible to have a small compact staff that can handle the planning for the food and fiber of the nation, as well as the people who produce, process, and distribute the finished products from these soil grown materials.

The Department of Agriculture, powerfully staffed with commodity experts, agricultural economists, administrators, researchers, field agents, marketing experts, "stockpilers", etc., will actually be doing the bulk of the staff work—assembling the raw material, the reports, the estimates, and raising the policy questions.

Final authority rests with NSRB, of course.

Part of the reason for this subcontracting of the staff work on food to USDA is the fact that such mobilization planning cuts straight across NSRB's whole field—production (food is one of 30-odd NSRB divisions), human resources, economics, and transportation.

USDA staffers, of course, will work with material they've been over many times. For instance, many of the questions raised in planning for mobilization call for assembly of facts and policy questions that were a part of the department's recent report on the 25-year outlook for agriculture, or the department's report and recommendations last year for a long-range farm program. Just naming some of the problems that cropped up in handling food and farming during World War II reveals the scope of NSRB's job: Labor, farm machinery, fertilizer, power, transportation, storage, military vs. civilian needs, price policies, procurement, crop controls, and incentives.

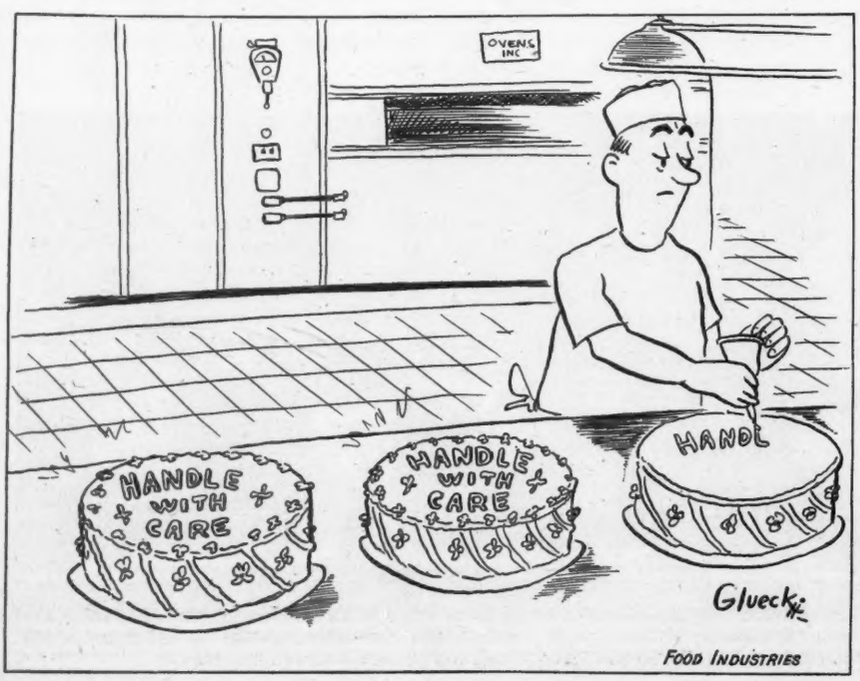


Harris & Ewing

F. CHAPIN WEED

This mobilization planning by USDA and NSRB is a much larger thing than the question of "stockpiling" of wheat proposed by Congressman Hope, who was chairman of the House Agriculture Committee at the time he made the suggestion. In reality, Hope's suggestion was a way of thinking or considering farm crop surpluses. While the wheat or cotton or corn price support purchases by the Commodity Credit Corp. would actually be the same old operation, such programs would be made more palatable by calling them "stockpiling for defense."

However, stockpiling for defense would be subject to the same pressures, the same economic and political controversies that have appeared in the past—regardless of the form the "stockpiling" idea has taken. Henry Wallace's ever-normal granary is an example.



Cocoa Allocations

AN INTERIM allocation of 180,000 long tons of cocoa beans has been recommended for the U. S., for the year beginning Oct. 1, by the International Emergency Food Committee of the FAO Council. Total interim allocations for all countries amounted to 446,390 long tons, about 75 percent of the anticipated world supply of 600,000 long tons.

Final allocations will be recommended early in the new year—probably in late February, when information on the probable supply will be more complete.

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Note these important design advantages:

- **Open type, single suction impeller, designed for high efficiency at moderate heads.**
- **Volute of close-grained cast iron with water passages so smooth that friction and back eddies are minimized.**
- **Deep stuffing box permits proper packing without undue tightening of the gland . . . simple, easy repacking.**
- **The same proved ball bearing frame construction for smooth operation and long life used in the other side suction pumps of the Fairbanks-Morse family. Bearing nearest impeller takes radial load only and is free to move endwise. Drive-end bearing takes both radial and thrust loads. Both are sealed to keep lubricant in . . . dirt and moisture out.**
- **One-piece, solid cast frame for long service . . . suitable for heavy duty belted or direct connected drives. Foot of frame forms a substantial base.**

For all the facts on this new line of pumps, see your Fairbanks-Morse distributor or branch house pump engineer. Fairbanks, Morse & Co., Chicago 5, Ill.

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British Combine

BRITISH HOME-GROWN SUGAR

These sugar beets are ready for processing at the Felstead, England, plant of the British Sugar Corp. The crop, expected to reach 4,000,000 tons, was home-grown by 45,000 growers. Harvest should supply 1,500,000 people at present sugar ration.

DEVELOPMENTS IN DISTRIBUTION

Hold Tinplate Exports To 130,000 Net Tons

A GOVERNMENT-PROPOSED export quota of 113,000 net tons of tinplate, to be shipped during the first quarter of 1949, was established following a meeting of the Tinplate Industry Advisory Committee with officials of the Office of Domestic Commerce and of other interested government agencies.

Approved foreign orders for tinplate, up to the 113,000 ton limit, will be supported by ratings (CXS) and must be accepted by tin mills, officials said. This tonnage is the minimum considered necessary to carry out foreign policy objectives. Rated orders for tinplate are licensed only for preservation of perishable foodstuffs.

Additional quantities of tinplate, up to 17,000 tons, may be licensed, but not rated, for export during the first three months of next year. Of this total, 9,500 tons may be licensed for packaging abroad of foods to be imported into the U. S.

Up Cold Storage Space 4 Percent in 2 Years

NET piling space in all types of cold storages in the U. S. increased by 20,000,000 cu. ft. from Oct. 1, 1945 to Oct. 1,1947, according to USDA. This brings the total net piling space in America's cold storage plants to an all time high of 497,035,000 cu. ft., and gross space amounts to 675,041,000 cu. ft., as estimated by the survey.

Over one-half of this space is accounted for by public refrigerated warehouses. The remainder is divided between private and semi-private cold storages, meat packing plants and apple houses.

The increasing demands for freezer storage space, due to the rapid development of the frozen foods industry, have been met by the public refrigerated warehousing industry through the addition of 5,000,000 cu. ft. in the below 29-deg.-F. range during the 1945-47 period. Some of this space is the result of new construction, and some is former cooler space which has been converted to the lower temperature ranges. Public cold storage space has continued to expand during 1948, but it is not covered in this report.

Frozen Food Industry Agrees on Convention

COMPLETE agreement among all segments of the frozen food industry has resulted in the scheduling of the 1949 Frozen Food Industry Convention & Exposition for the Hotel Stevens, Chicago, Mar. 6-10. An all-industry committee, composed of the presidents of the associations involved, has elected as its chairman, Fred J. Becker, president of the National Association of Frozen Food Packers.

Other president-members of the

committee are: W. J. Walsh, National Wholesale Frozen Foods Distributors; T. N. St. Hill, National Preservers Association; Watson Rogers, National Food Brokers Association; Edgar M. Burns, National Association; and W. L. Pavlovski, Quick Frozen Foods Association of Chicago. Fred M. Deutsch, Marathon Corp., is the exhibitors' representative.

"Ban Yellow Margarine Then End Tax"—ABI

A RESOLUTION urging Congress to "prohibit the imitation of butter through the commercial manufacture or sale of oleomargarine colored in semblance of butter, and after such ban has been ordered by law, to discontinue all oleomargarine taxes and license fees" was the highlight of the American Butter Institute's 40th Annual Meeting, in Chicago, Nov. 4 and 5.

In support of the resolution, the Institute pointed out that butter serves as the balance wheel in the dairy industry, absorbing surpluses and supplying deficiencies, and represents 13½ percent of the total farm income. It added that "the substitution of yellow oleomargarine, by eliminating a major part of the butter market, will result in wholesale dispersal of dairy herds and deal a serious blow to soil conservation."

G. C. Mahle, president of the Institute, told delegates at the opening session, attended by over 500 people, that although the immediate problem facing the industry is the margarine situation, an organized selling job must be done. He outlined the promotion programs and urged members to cooperate with the National Dairy Council in making the consumer aware of the improved quality of butter and the comparatively low price. He added that in 1920 a laborer worked one hour for a pound of butter while in 1948 he worked one half hour.

Louis Bromfield, author and farmer, told members at the luncheon that the farmer is becoming the most important citizen in the world and is likely to be a highly prosperous member of our society for many generations.

The afternoon session was devoted to discussions of four-day grading programs—the payment of a premium price for cream delivered to receiving stations not more than four days after separation. There was a movie on mechanical separators, also a discussion of improving cream quality.

Walter B. Garver, agricultural economist of the Federal Reserve Bank of Chicago, spoke to the group on gains in the per capita food consumption, showing with colored slides the increases in demand by lower income

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Quick-freezing 80,000 Pounds of Poultry with

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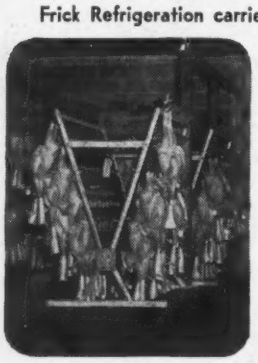
Refrigeration

That's just one day's work at the new plant of the Washington Co-Operative Farmers Assn. But it means 16,000 chickens or 4,000 turkeys have to be processed, precooled, quick-frozen, and stored at zero.

Frick Refrigeration carries the entire cooling load at this Mt. Vernon, Washington plant—just as it does in the world's largest quick-freezer, across the continent at Bridgeton, N. J.



Precooling Poultry at 33°F.

If you're anywhere in between and need refrigeration, get in touch with the nearest Frick Branch Office or Distributor. They're in principal cities everywhere; also supply dependable air conditioning and ice-making equipment. This installation made by the Lewis Refrigeration & Supply Co., Frick Sales-Representatives in Seattle.

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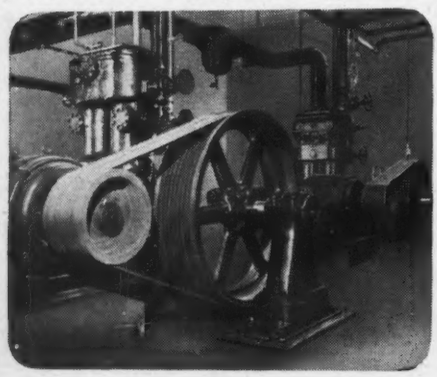
Two of Five Frick Compressors at Mt. Vernon



Wide World

SAFE FROM WINTER FREEZE

Deep trenches provide storage space for the overflow potato crop on Long Island. These workers on a farm near Hicksville plan to dig them up later for marketing.

groups for dairy products in general, although the demand for butter has decreased in all income groups. The challenge to the industry, he said, is to go out aggressively to recapture lost markets from competitors and to reclaim any prestige butter may have lost.

Mrs. Rose Marie Kiefer, secretary-manager of the National Association of Retail Grocers, urged consistent quality and a more efficient merchandising program to keep retail grocers aware of the possibilities of butter.

E. J. Davidson, vice-president of Wilson & Co., Chicago, was elected president of the Institute, succeeding G. C. Mahle, president of Sugar Creek Creamery Co., Danville, Ill. G. L. Ogle, vice-president of Ideal Pure Milk Co., Evansville, Ind., was named vice-president.

Three new directors chosen were George Allebrand, Hollywood Creamery Co., Colorado Springs, Colo.; D. H. Manwaring, Nelson-Ricks Creamery Co., Rexburg, Ida.; and A. M. Femrite, Mandan Creamery & Produce Co., Mandan, N. D. All other officers were re-elected.

High-Extraction Flour Passes Consumer Tests

UNIFINE, the flour derived from a Washington State College-developed mill that gives a pound of flour for a pound of wheat, under test by WSC's college of home economics for the past six months, has been found to be highly acceptable to the consumer, says Dr. Barbara A. McLaren, Division of Foods & Nutrition.

The name Unifine was coined for the flour because the mill turns out extremely fine flour in only one operation.

The college reports that in "consumer acceptability tests conducted last spring in the student dining halls at the college, the bread made with Unifine flour was preferred over white bread. The tests were conducted over a three-week period.

The first week data were collected on the amount of bread consumed; in the second week, Unifine was offered (on the cafeteria basis) along with white and whole wheat bread as in the first week; and during the third week whole wheat bread was withdrawn from the offering. During that third week, the students consumed nearly twice as much Unifine bread as white, and total bread eaten by the same number of students rose more than 25 percent."

National Canners Film Boosts Better Labels

A NEW color film, describing its program to help the canning industry develop better labels, has been prepared by the National Canners Association. The 16-mm. sound film, which runs about eleven minutes, will be available, free of charge, to any interested food group.

The film points out the importance of labeling, especially since the rise of self-service markets in which the customer has no assistance in selecting the brand she chooses to buy. It is noted that the label is on just a few No. 2 cans, displayed on a food store shelf, comprise the equivalent in size of a full-page ad in one of the leading consumer magazines.

The film then illustrates exactly what kinds of labels the NCA program is promoting, with examples of several

ways of showing brand name, style of pack, sweetness of sirup, quantity expressed in terms of cupfuls, number of pieces or servings, and the standard term that describes quality characteristics of the product inside the can.

The film was made under the supervision of Happer Payne, director of NCA's labeling division. The association plans to distribute it primarily to state and local groups of canners, and also food wholesalers who have their own brands. Among others who will circulate the film to their memberships are the National Retailers Association and the National Food Brokers Association.

ICC Trying to Clear Food Material Terms

A HEARING got under way at the Interstate Commerce Commission in Washington last month to find out just what is "an agricultural commodity" and what is "a manufactured product thereof."

All this is not mere bureaucratic comma-chasing. The hearing represents a real victory in a long fight by farmers and food growers to hold the line on a law that lets them ship their produce at low cost—in trucks of operators, who do not have to abide by ICC rate regulations.

The outcome could mean higher costs to some food processors— or lower costs, or no change—depending on which way the commissioners decide the questions involved.

The commissioners got help in deciding the question from these groups on both sides of the scrap:

(1) The American Trucking Association, representing the organized, regulated truckers—and the railroads, who want ICC to keep down the business available to unregulated truckers.

(2) Vociferous groups of fruit and vegetable growers, western and southern fruit co-ops, flower growers, farmers, farm organizations, state commissioners of agriculture, etc., who want more products on the "unmanufactured" exempt column, and fewer defined as "manufactured."

Began a Year Ago

The so-called Harwood Case, which brought the whole ruckus to a head, began nearly a year ago when, in approving one Norman E. Harwood's application for a trucking permit, ICC said:

"The cleaning, washing and packaging of fresh vegetables in cellophane bags or boxes for sale to consumers . . . remove them from the class of unmanufactured agricultural commodities. . . ."

When this news got around, a howl went up from the fruit and vegetable

What's alike about a . . .

Banker?

Financial houses use Air Express regularly to ship checks, valuable papers. Bankers know *speed pays.*

Florist?

Among biggest Air Express users are retail and wholesale florists. They've found *speed pays.*

Food Manufacturer?

This industry gets machinery replacement parts and supplies regularly by Air Express. In this business, *speed pays.*

Speed pays in your business, too!

And you can't beat Air Express for speed. It's the *world's fastest* shipping service. Goes on all flights of Scheduled Airlines. Door-to-door service, no extra cost. Low rates: 28 lbs. goes 500 miles for $4.30, 10 lbs. for $1.98. Phone local Air Express Division, Railway Express Agency, for fast shipping action.

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- Moves on all flights of all Scheduled Airlines.
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Lightest weight steel conveyor.
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Stands may be placed at any point.
One man can carry two 10 ft. sections.
Full selection of sections.
Write for bulletins:
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SOMETHING NEW ADDED

Close to 2,000 ft. of Plexiglas, in a variety of colors, add a new spectacle for Atlantic City visitors and a bright new front to one of Food Fair's supermarkets.

growers all over the country. There is a trend toward pre-packaging of fruits and vegetables—and the growers and sellers saw in ICC's Harwood ruling a restriction on their freedom to take such produce to market. They are fighting especially against the higher transportation charges they would have to pay on every load they did not haul to market themselves. (There is no question about the farmer's freedom from ICC rules in hauling his crops anywhere in his own trucks.)

Case Reopened

The Department of Agriculture immediately took the lead in a campaign to get ICC to re-open the Harwood case. Furthermore, it also wanted ICC to undertake a general investigation of the whole subject. USDA wanted a chance to show ICC that its one-by-one rulings over the years had cut back the meaning of "unmanufactured agricultural products" to the point where its benefits to farmers were almost disappearing.

Among the products that the USDA says are affected are frozen fruits, vegetables, and seafoods; dyed oranges; defuzzed peaches; dressed poultry; shucked oysters and beheaded shrimp; fish that have been filleted; lobsters; shelled and unshelled peanuts, pecans, and walnuts; pitted cherries; and polished fruit.

ICC finally decided to kill two birds with one stone, as suggested by USDA: It would re-hear the Harwood case, and it would undertake on its own a general investigation. This means that the outcome of the combined hearing might:

(1) Put many agricultural products now exempt back under the "manufactured" category by applying the Harwood principle; or

(2) Put many products now listed as "manufactured" under the "unmanufactured" heading and thus permit shippers to use the services of non-regulated truckers.

No one knows for sure just how much of the country's eatables might be affected by a ruling. But the experts are sure that the preponderance of a good many agricultural products now reach their markets by truck.

For example, in 1916 practically all livestock reached market by rail. In 1946, at 62 to 68 principal markets, 57.2 percent of cattle, 62.3 percent of calves, 60.7 percent of hogs, and 35.9 percent of sheep and lambs came in by truck. Live poultry received in New York, Chicago, Philadelphia and Boston comes 85 percent by truck. New York receives 59 percent of its fluid milk by truck, Philadelphia 92 percent, Chicago 85 percent, and Cleveland, Los Angeles and Detroit 100 percent. The U. S. average is 85 percent.

Trend Continues

From Southern California, the Rio Grande district of Texas, and Florida, fresh fruits and vegetables during winter months move mostly by truck up to 500 miles; rails get larger tonnage on longer hauls. But trucks are making inroads on long haul movement and this trend can be expected to grow in future.

In Florida, trucks have carried the major part of produce to all markets within 700 miles; heavy tonnage goes to New York and Philadelphia. Recently an experimental truckload of carrots and lettuce from Salinas, Calif., arrived in New York in perfect condition after a 5-day trip.

Of 5,500,000 trucks registered in the U. S. in 1946, over 80 percent were owned by private carriers. About 35 percent of all trucks registered are owned by farmers. An estimated 12 percent were common or contract carriers engaged in inter-city or local hauling.

The regulated truckers claim there is no saving involved for either the con-

sumer or the farmer in this exemption. They cite eggs as an example:

Price of eggs is set by the market. A dealer picks them up from the farmer in his exempt truck. He washes, candles, and packages the eggs. Then he gets an exempt carrier—not a certificated carrier—to haul the eggs to the market. The for-hire trucker cannot compete with this exempt carrier. The savings, say the truckers, do not go to anyone but the egg dealer.

More Food Cans

OUTPUT of food cans for the first six months of 1948 was 10 percent above the tonnage listed for the same period in 1947. Figures reported by the Can Manufacturers Institute indicate shipments of 903,344 tons for food cans between January and June of this year, compared with 819,361 tons in the January-June period in 1947.

The east north central division received the largest amount—435,511 tons. This division takes in the food packing plants in Illinois, Indiana, Michigan, Ohio and Wisconsin.

AMA Packaging Show

AMERICAN Management Association's 18th national packaging conference and exposition moves back on the calendar in 1949, to May 10-13. As in recent years, the meeting will again be held in Atlantic City's Public Auditorium. Lawrence A. Appley, AMA president, said arrangements for the exposition were being made by an advisory committee, of which J. M. Cowan, The Dobeckman Co., Cleveland, is chairman. J. D. Malcolmson, Robert Gair Co., is chairman of the planning council, which will formulate the conference program.

Wide World

LAST OF THE QUEENS

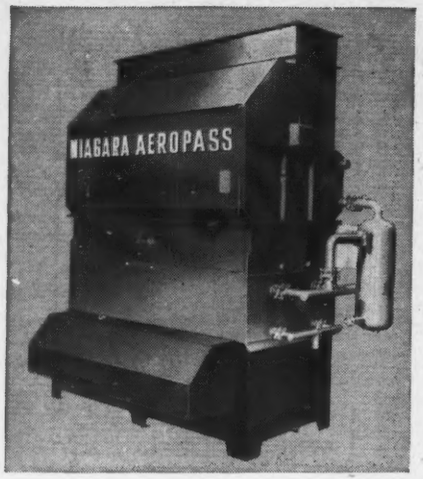
This is positively the last "queen" we will show this year. It says here she is a candidate for the annual Orange Bowl queen job. It also says she is a blonde.

Easy TO SERVICE

- A good strainer protects your equipment and pipelines.
  Maintenance men said "give us a strainer with a blow-off cap that comes out easily and makes up tight; a screen that can be put back in place without a lot of fiddling around".
- The easy-to-remove Yarway cap meets these requirements. It has straight (not tapered) thread, machined face and spark-plug-type gasket. Permits easy removal for cleaning. Insures proper screen alignment when replaced in body.
- Screen itself is of high grade woven monel wire, or perforated if desired.
- Body of strainer is iron or steel, cadmium-plated for protection against corrosion and for better appearance.
- Available in six sizes, ½" to 2", for pressures to 600 lbs. Reasonably priced. Hundreds of thousands in use. Stocked and sold by 150 Mill Supply Houses.
- See your dealer or write for Bulletin S-201.

YARNALL-WARING COMPANY
127 Mermaid Ave. Philadelphia 18, Pa.

YARWAY STRAINERS
"Police the Pipelines"



New Condenser Cuts Refrigeration Costs Saves Cooling Water

● The Niagara Aeropass Condenser cuts the cost of refrigeration by running compressors at lower head pressure, saving up to 35% of power. It uses no cooling water.

The refrigerant gas passes thru two coils in an air stream. The first, "Duo-Pass" dry coil, removes the super heat by air cooling and condenses oil vapor. The second, condensing coil, drenched by recirculated water spray, condenses by evaporation, transferring to the air 1,000 BTU for every pound of water evaporated. This, done at low temperature, no scale forms on condenser tubes to clog air passage.

Between the two coils is the "Oilout", which purges the system of crankcase oil and dirt, keeps it always at full capacity.

The "Balanced Wet Bulb" control holds head pressure at the practical minimum. It automatically proportions the fresh air stream to the condensing load with the full benefit of power-saving on cool days, providing full capacity for peak loads.

Niagara Aeropass design results from over fifteen years' experience condensing by air. It is completely trustworthy for year 'round operation. Users say, "It saves half the difficulties and labor of running a refrigeration plant."

Units range from 10 to 100 tons capacity. For full information ask for Bulletin 103.

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Wide World

ITALY BACK IN BAKE-OVEN FIELD

This electric oven, built and displayed in Italy, bakes about 15,800 lb. of biscuits in eight hours. Price-tagged at about $7,500, several are said to be scheduled for early export to South America. Maker is Ima Marinoni Co., Verona.

THE PROCESSING PICTURE

Navy Food Questions Studied by Industry

IN RECENT YEARS, activities of Navy Industrial Association committees have been found helpful by Navy subsistence officers. Currently active are NIA task groups working on the *Navy Cook Book*, dairy products, shortening, dried yeast, cereals, canned meats, and emergency rations.

Beginning Jan. 1, a Navy recipe service will be inaugurated as part of a three-year program. Revision of the *Navy Cook Book* is now under way, with the assistance of a task group headed by Clark Kizzia of General Foods Corp.

Securing of fresh milk products for use afloat and in hot climates is one of the major efforts of the dairy products task group under the chairmanship of C. E. Beardslee of The Borden Co.

Suggested changes in lard specifications to bring its performance up to the peculiar demands of the Navy have resulted from work of another task group, headed by John Moninger of the American Meat Institute.

Dried yeast with an increased storage life has resulted from work done by the yeast industry. Robert W. Brooks of Standard Brands has headed the group operating through the NIA food committee.

Elimination of weevil infestation in cereal products is a subject on which research continues. The committee chose E. C. Baum of Continental Baking Co. to head this group.

Also continuing is the long-range research problem of developing a sterile canned ham which will not require refrigeration. Harry J. Williams of Wilson & Co. is chairman of this task group.

In addition to these developments by the food committee and its task groups, under the chairmanship of W. P. Lillard of General Foods, there is also comparable work by many other NIA committees. Several of these efforts are of interest to the food industries—for example the work of the packaging group. Under the chairmanship of E. K. Walsh of American Can Co., this is one of the recently formed advisory committees.

Study Western Wheats At Washington State

WASHINGTON STATE COLLEGE has established on its campus a western wheat quality laboratory, which it reports has long been advocated by breeders, growers, and processors as well as professional groups of the Northwest. The new laboratory, one of four in the United States and the only one west of Kansas, is jointly sponsored by the U. S. Department of Agriculture and the college's agricultural experiment stations.

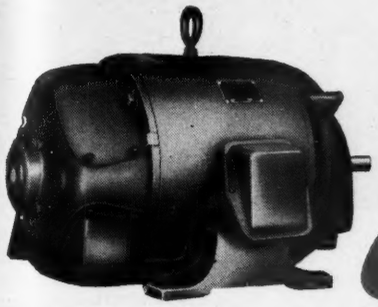
The research project has three principal goals: Development of better pastry-type wheats, development of high protein bread-type wheats, and classification of the qualities and properties of all major western wheats.

Samples from the 1948 *spring* wheat crop are now arriving at the laboratory. These are being supplied by 13 experiment station breeding plots in Washington, California, Idaho, Montana, Oregon and Utah.

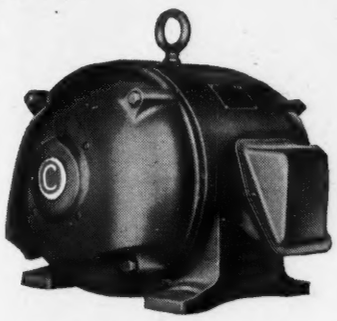
M. A. Barmore, the laboratory's director, says that for at least two years

Wherever Splashing Liquids Create a Hazard...

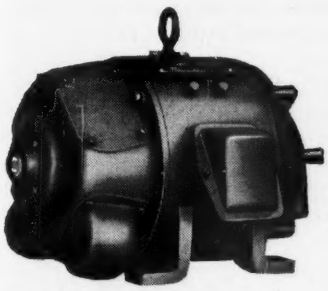
Specify a Century SPLASH PROOF Motor



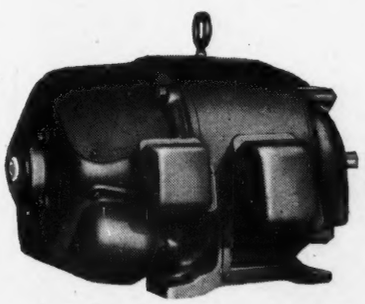
Century 7½ HP type RS Repulsion Start Induction Brush Lifting Splash Proof Motor



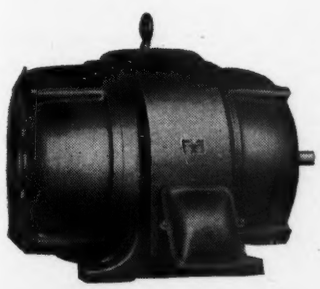
1 to 30 HP Squirrel Cage Induction 3 Phase Splash Proof Motors



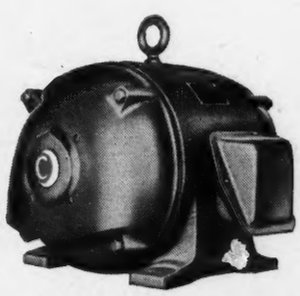
1 to 7½ HP Direct Current Splash Proof Motor



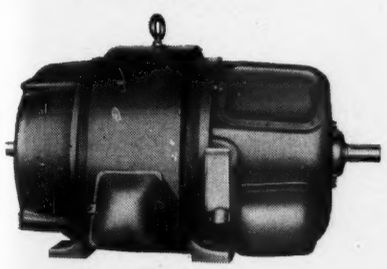
3 to 25 HP Slip Ring Induction 3 Phase Splash Proof Motors



40 to 100 HP Squirrel Cage Induction 3 Phase Splash Proof Motors



1 to 20 HP Capacitor Start Induction Single Phase Splash Proof Motor



30 to 100 HP Slip Ring Induction 3 Phase Splash Proof Motors

Century Splash Proof motor frames keep the vital parts of the motor dry—even when the full force of water from a hose is turned directly on it.

Century Splash Proof motors may help to protect the reputation of the machines you build through the protection provided in their construction—against splashing liquids, plant wash downs or falling solids.

Century Splash Proof motors are available in a wide range of types and sizes and electrical characteristics for all popular applications.

In addition, Century builds a complete line of various types of electric motors in sizes from 1/6 to 400 horsepower. Popular types and ratings are available from factory and branch office stocks.

Specify Century motors for all your electric power requirements.

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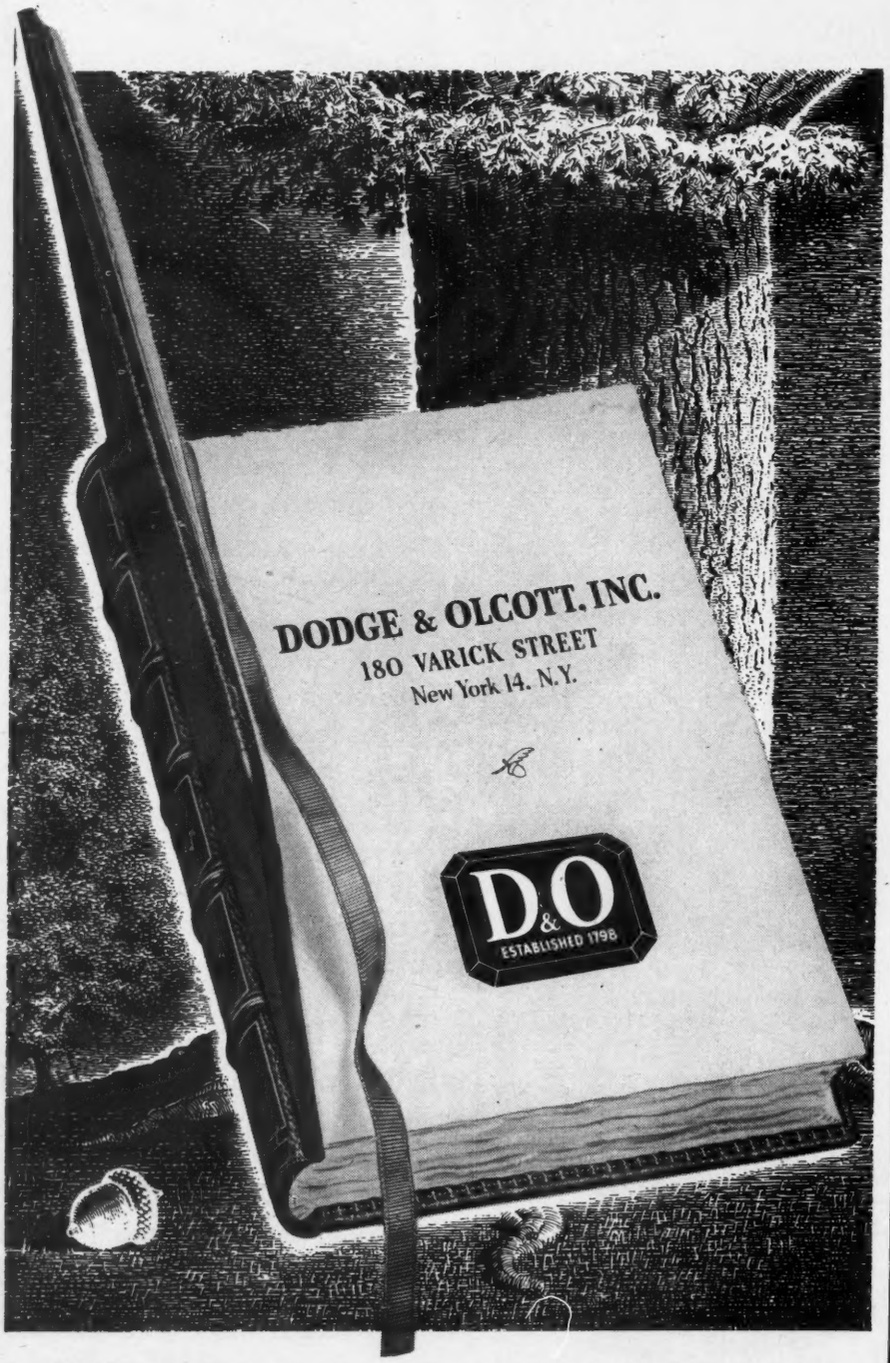

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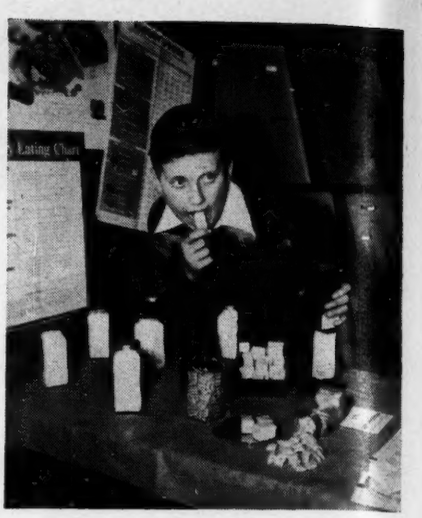


Wide World

GOOD THOUGH NUTRITIOUS

Efforts of the National Confectioners Association, in cooperation with USDA, to find a palatable candy that contains a desirable balance between protein and carbohydrates appear to have met with success. At National Chemical Show in Chicago, ingredients of candy stick were displayed in these various jars.

tests will be made mainly of soft wheats, then gradually hard wheats will be included. Recommendations concerning promising varieties for either pastry or bread flours won't be made until the wheats have been tested over a number of years.

Canned Apple Shapes Retained by Calcium

FOOD SCIENTISTS have found that by adding calcium they can retain more of the original firmness of apples during canning or freezing. Tests at the Geneva, N. Y., Experimental Station also show that these calcium-treated apples keep their shape better in pies than do untreated apple slices.

Dr. Z. I. Kertesz states that when apples are soft due to advanced ripening, the calcium treatment is useful in making the tissue firmer before processing. For canning, he advises adding 0.1 percent calcium chloride to the salt water in which the apples are usually soaked before steam blanching. For freezing, blanching in water to which 0.5 percent calcium chloride has been added has proved successful under commercial conditions.

During the past season, a number of calcium salts other than the chloride were tested by the station chemists. Under certain conditions the use of calcium lactate might be even more beneficial than the chloride. The lactate is less corrosive on the equipment, and its more neutral flavor results in a better tasting apple pie.

"The full benefit of calcium firming of apples does not usually show up,"

Dr. Kertesz points out, "until the fruit has been used in a pie. The heat resistance of these treated apples is remarkable. They keep their shape better in the finished pie."

Association, USDA Agree On Egg Product Studies

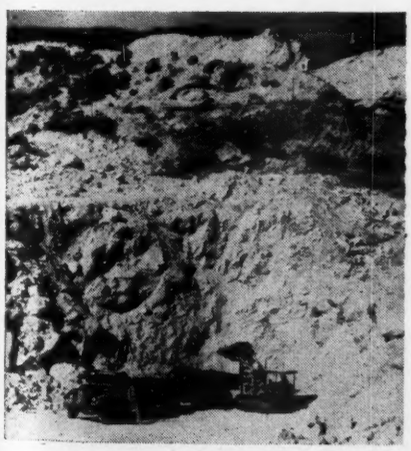
ANNOUNCEMENT of agreement on a one-year $20,000 joint research project was made by Roy W. Lennartson, associate director, poultry branch, USDA, at the Fall Meeting of the National Egg Products Association, in Chicago.

The agreement is between the National Egg Products Association, which is supplying one-half of the funds, and the research division, Department of Agriculture. The move is in accordance with provisions under the Hope-Flanagan Research & Marketing Act.

The project is to study methods by which the economic loss of shell eggs may be eliminated, and it is to be carried out by the association research laboratory under the directorship of Dr. O. J. Kahlenberg. USDA research division officials are to function only in an advisory capacity, with Dr. Harry E. Goresline available for collaboration.

Particular emphasis will be placed on study of present commercial methods and equipment for washing and sterilizing shell eggs to determine which methods and facilities are most satisfactory to obtain low breakage, low bacterial counts, and low cost of operation.

Included will be a study of the effectiveness of germicides, either in the washing operation or afterward, to

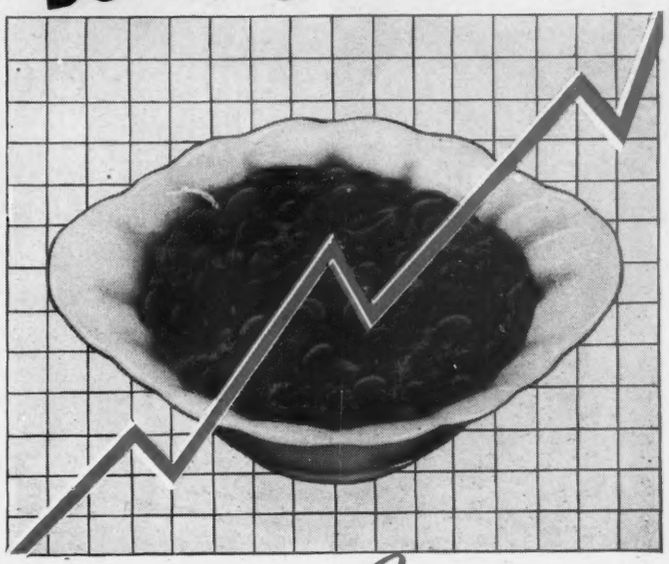


Wide World

MINING OYSTER SHELLS

Oyster shell mining operations dig away at Tapo Mountain, near Santa Susana, Calif. This accumulation of marine sediment is at least 2,300 ft. deep. It provides calcium for animal and poultry feed and a mix for fertilizer.

BOOST *Chili* SALES



with true, tantalizing *Chili* flavor & color

Many of the nation's most prominent food producers attribute their success to the fine art of proper seasoning.

In the production of *chili products,* skilled seasoning is doubly important, for chili lovers choose by both flavor *AND* color. Rich red color stimulates appetite appeal—the urge to buy! The tantalizing true flavor of real chili keeps consumers convinced – resulting in repeat sales!

Our superb, uniform blends of Chili Powders and Peppers impart a rich, spicy flavor to your products which looks as good as it tastes. The bright rich red color, the true tantalizing chili flavor stimulates chili sales. Careful selection of fresh new crops . . . modern scientific dehydration and milling methods perfected through more than 28 years of experience and research . . . are your assurance of unvarying quality in each grade, every shipment.

Our Chili Powders and Peppers are used extensively by A.M.I. and N.I.M.P.A. members. Formulas, samples and full particulars promptly furnished on request. Inquiries are invited!

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Packers Special
X 5

CHILI PEPPERS*
S S
Packers Special
C S

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This envelope holds enough Minute Gelatine to jell 2 cups (1 pint) liquid (4 to 6 servings).
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Make jellied entrées and salads the same quick way. See enclosed folder.
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Brown Packets are made to your exact specifications, with your design, trademark and directions for use all carefully reproduced. They are precision sealed at the bottom and along the back with uniform open ends for fast, accurate filling without waste.

Scores of today's food fast sellers are making sales history in Brown Packets. Send for a complete range of samples of these packeting successes. Your most detailed questions will be cheerfully answered.

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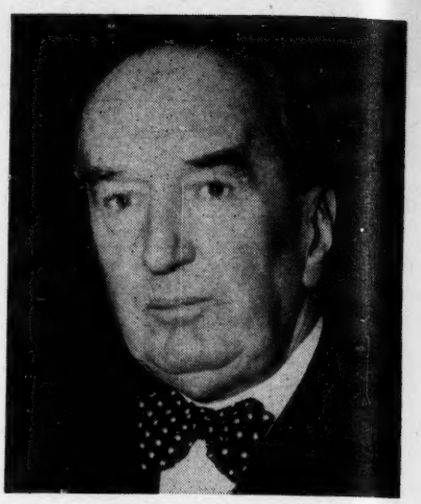


Wide World

LOOKS TO U. S. WHEAT

Viscount Bruce, chairman of World Food Council, declared upon arrival in this country last month, that the world would continue to depend on the U. S. for the 45 percent of wheat imports supplied by this country during the past year. The council, meeting in Washington, will survey the world's 1949 food needs.

minimize danger of bacterial contamination of the egg meats when the egg shell is broken and to lower losses of eggs because of rots and mold growth during storage. The joint project is likely to continue for more than one year.

Other research projects recommended by the association's task committee under the chairmanship of Jay G. Odell are:

1. Development of frozen egg standards and grades that will define quality factors. 2. Development of standards of color identification that parallel standards of quality and are based on a uniformly acceptable method. 3. Definition of quality factors in terms of egg solids, percent of added ingredients, such as salt, sugar and like, ammonia content, pH, E-coli, yeast, mold and direct bacteria plate counts. 4. Survey to determine and record consumer likes and dislikes of color in eggs and general consumer acceptability of varying egg color in bakery products, noodles, mayonnaise and salad dressing. This survey is to be a market research project carried out on consumer purchasers.

Research projects worked on by the association research laboratory since its establishment a year ago, as reported by Dr. Kahlenberg include:

1. Development of a method of measuring yolk color for plant and laboratory use, 2. determination of proper method of sampling frozen eggs for solids and bacteria content, and 3. study of factors affecting the whipping qualities of egg whites to improve the whites for use.

In addition, the laboratory aided 48 companies by analyzing approximately 900 samples for solids, bacteria content and color to guide the companies in improving and controlling the quality of their shell, frozen and dried eggs.

Report Findings

The reported results are: 1. A method of determining yolk color which meets the approval of the association's technical committee as a tentative method, subject to approval by the executive board, before release for publication and submission to manufacturers of mayonnaise, macaroni, noodles, confectionery and baked products.

2. Need was seen for more study of technics for sampling frozen eggs to determine solids and bacteria content. Although five different methods were tested, results were quite variable and inconsistent with respect to solids and bacteria in relation to location of taking of samples by drilling.

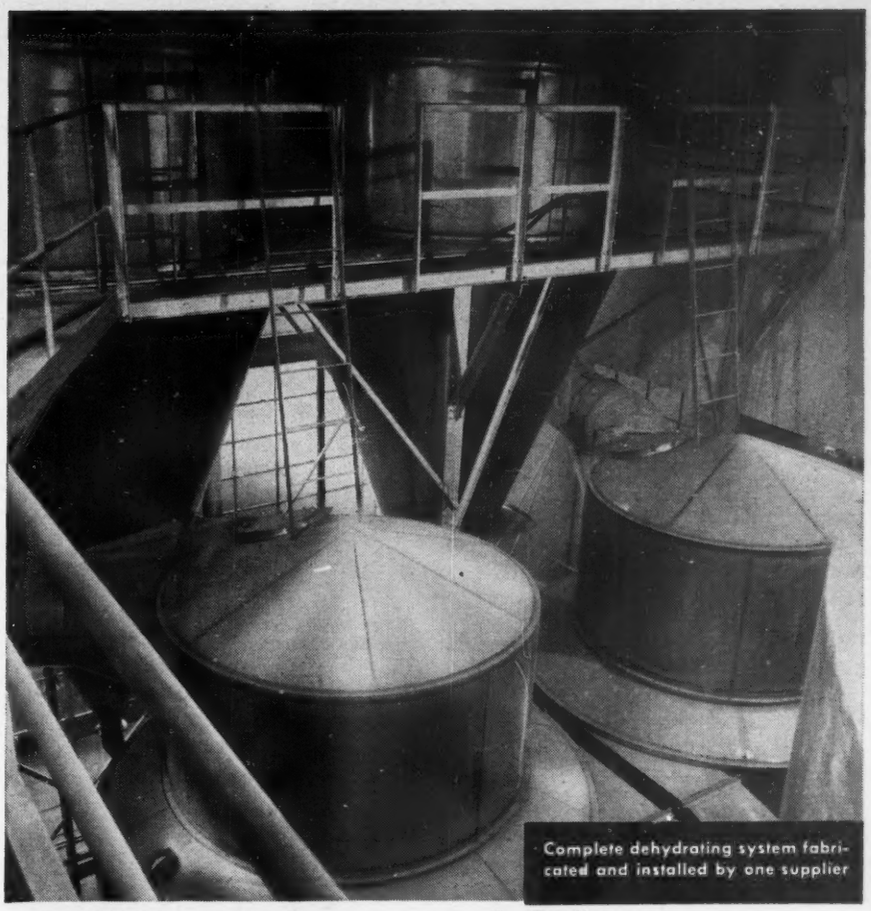
3. There was determination by angel food cake baking tests that summer egg whites will make as good cakes as will spring egg whites, if the summer whites are properly handled and stored with respect to time and temperature to maintain a "fresh" Grade-A quality in the eggs.

Results of study on the use of quaternary ammonium compounds indicate that the washing of dirty eggs with a sanitizing detergent in a tank type washer, then rinsing them with a germicide, aids in lowering the bacterial counts on the shell surfaces. The bacterial counts in the broken out egg meats are also lower when this washing and rinsing process is used.

Wide World

CALIFORNIA PUMPKIN?

Well, it was grown in Chino, Cal., but it is an Australian field variety. In any case, it weighed 100 lb., and was thought deserving of a blue ribbon at the recent L.A. County Exposition at Pomona.



DAY stainless steel fabricating meets exacting specifications

A single dehydrating plant which could be used for whole milk, skim milk, powdered eggs and ice cream was required by Delaware County Farmers' Cooperative Milk Company, Delhi, New York. Naturally, the equipment had to resist corrosion and be sanitary. But above all, because of its many uses, it had to be *easy to clean.*

Corrosion-resistant stainless steel was recommended by engineer John I. Ormond of East Grand Rapids, Mich., to meet high sanitary requirements. Ormond designed the complete installation in cooperation with **DAY** Company engineers. The equipment consisted of 5 **DAY** DUAL-CLONES, spray chamber with turbulator, and all necessary duct work and structural steel.

Due to Ormond's previous business relations with The **DAY** Company, he had complete confidence in their ability to custom-build the entire installation. Expert **DAY** mechanics and welding technicians fabricated this equipment from stainless steel. To insure sanitary conditions, they polished *smooth* all inside surfaces in contact with food.

Today, the modern dehydrating plant of Delaware County Farmers' Cooperative stands as another example of **DAY** Company's ability to fabricate equipment of stainless steel for the food industry.

DAY Company fabricates equipment of stainless steel up to 10 gauge for any branch of the food industry. Capable DAY engineers cooperate with you or your engineer to work out construction drawings and shop details. Their expert technicians custom-build your equipment to specifications. DAY Company's 67 years of service to industry assure quality fabricating at minimum costs.

*For information on stainless steel fabrication for your plant, write-to-***DAY!**

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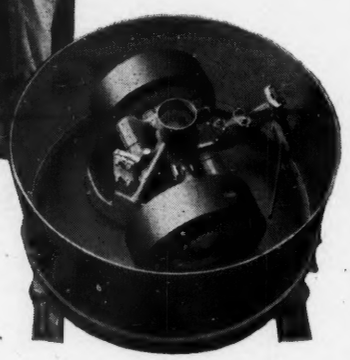
SIMPSON *Intensive* MIXER

SOLVES A DIFFICULT SPICE BLENDING PROBLEM

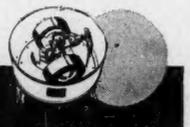


A large midwest spice manufacturer had difficulty in uniformly mixing and blending a proportionately small amount of Cream of Spice into a carrier. The seasoning was not thoroughly dispersed in the carrier in the first mixing operation in a ribbon type mixer, and a time-consuming grinder operation was necessary to complete the dispersion. A Simpson Intensive Mixer was installed and, in a single operation, thorough mixing was accomplished.

THE MULLING PRINCIPLE OF CONTROLLED MIXING

The unique "mulling action" of a Simpson Intensive Mixer, shown above, is comparable to the rubbing, kneading and smearing action of a mortar and pestle. This kind of mixing action eliminates any "balling" of materials and quickly effects a thorough dispersion of the elements in the mix. The result is a finished product of uniform quality. Because of the positive control obtained throughout this mixing process, it is known as "Controlled Mixing".

• *Simpson Intensive Mixers are available in 10 sizes, from 1/5 to 50 cu. ft. capacity for mulling every type of dry, semi-dry or plastic material. Also available with oil, steam or water jackets for vacuum mixing, and may be had in corrosion-resistant materials. Let a National Engineer analyze your mixing requirements.*



NATIONAL ENGINEERING COMPANY

614 Machinery Hall Building • Chicago 6, Illinois

Wide World

BACKYARD BANANAS

Two large banana plants have been thriving in a Los Angeles backyard for the past 15 yr., yielding from 2 up to 3,000 bananas. Sheltered by pine trees, the plants have been damaged by frost only twice.

Dairy Products Course Is Altered at Rutgers

CHANGES have been made in the dairy products curriculum at Rutgers University to strengthen the scientific foundation of graduates.

Explaining the changes and their need, Dr. John W. Bartlett, head of the dairy department, said that a student in dairy products now needs to concentrate more in the basic sciences. A student must take required courses in qualitative and quantitative chemistry, along with nine credits in his major field of study before the end of his sophomore year.

Of the 152 credits necessary for graduation, 27 are electives to allow the student to select additional courses in phases of dairy work in which he is especially interested. Among these are business administration, research, and sales.

In addition, says Dr. Bartlett, a new course called "Quality Milk Control" has been added. This is expected to fill a need of students who are interested in private or public milk control work, such as milk inspection and commercial quality control field programs.

F&DA Food Standards

FOLLOWING are recent developments concerning Food & Drug Administration food standards:

Bread standards were scheduled for a hearing beginning Nov. 30. Additional material was expected to bring up to date the proposed order of Aug. 3, 1943. Discussing of new technology in the baking industry will probably include considerable detail on "softeners"

or "anti-staling" ingredients (as outlined on p. 145 October FOOD INDUSTRIES). Specifically requested by the Administrator was more information on the harmlessness and necessity of certain oxidizing chemicals discussed in the 1941-43 proceedings.

Flour bleaching with chlorine dioxide was to be made permissible by an order expected in mid-November, as a result of the October hearing. "An emergency condition" was found to exist, so immediate use of chlorine dioxide may begin. Aug. 1, 1949, was set as the date by which nitrogen trichloride bleaching and artificial aging must be discontinued. The tentative order was printed on page 5466 of the Nov. 2 *Federal Register*. Additional optional carriers for benzoyl peroxide were also to be permissible 90 days from date of publication of the final order.

Cheeses, salad dressings, and *frozen fruit* tentative orders on standards of identity were still awaited in early November.

All food standards of F&DA now in effect were reprinted in the Oct. 30 *Federal Register*. Copies of revised pamphlet known as *Definitions and Standards for Food; S.R.A., F.D.C.2* will probably be available soon.

Aussie Can Co. Designs New Infra-Red Oven

MELBOURNE—What is believed to be the world's first oil-fired infra-red drying oven has been designed and installed in Australia by the Major Furnace & Combustion Engineers Pty., Ltd. The oven operates successfully in the plant of the Union Can Co., Melbourne.

The installation was designed to operate on oil because electric lamps had proved unsatisfactory. They had a tendency to have their reflecting power impaired by traces of paint or varnish, and the heat impact on the throughput was not uniform enough. Inability to adjust the heat output had proved another disadvantage.

In the Australian oven, a panel of black steel sheet is heated by the hot combustion gases of a specially designed oil burner. The infra-red radiation is emitted from the black sheet in all directions and there are therefore

Globe Woven Belts are more than a manufactured product. Globe Belts are the outcome of practical research on every particular use to which they may be put. Globe Belts are the result of experienced, painstaking workmanship by artisans who know and like their job of making quality beltings. Globe Belts have proved their long-wearing material and efficient operation.

Yes—there's a world of difference in GLOBE Woven Belts. It will pay you to find out.

There's a 'specially engineered and tested-by-use Globe Woven Belt for practically every need of industry. For instance:

KANRY-TEX: The superior belting for food processors.

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ENDLESS WOVEN: No slippage: no vibration —for high-speed use.

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Many other GLOBE beltings are available for whatever particular use you may have. Your mill supply house (or we ourselves) will be glad to provide a complete list of GLOBE products. And at the same time give you proven facts and figures on their long-lasting and economical qualities.

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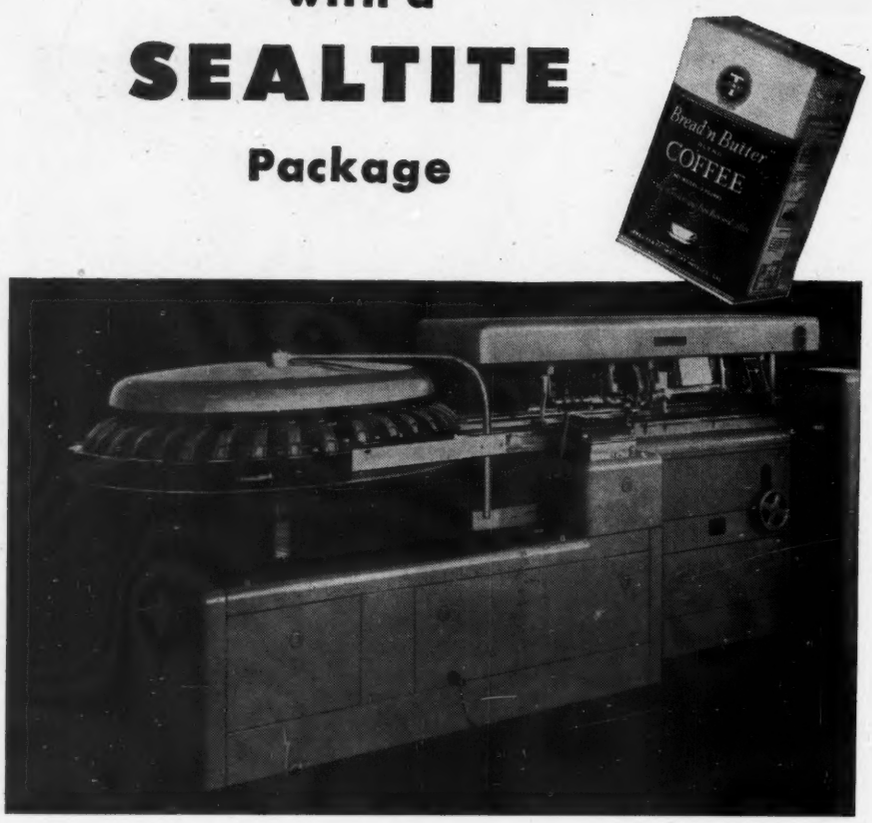

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- Any **STANDARD** gusseted bag can be used...no special premium priced bag is necessary.
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BUFFALO 13, N. Y.

no focal zones of maximum heat concentration and no "relatively blind" spots.

The internal diameter of the oven is considerably smaller than would be required in an electric oven of the same capacity.

Private Trade Boosts S. A. Cheese Exports

BUENOS AIRES — Argentina, which captured the former Italian cheese trade with the United States during the war years, has still managed to hold on to it some three years after the war's end.

The various Italian-type cheeses have always been popular in the U. S. (Italy shipped us 13,829,000 lb. in 1940). And Argentine cheeses, which are similar to the Italian, were a welcome substitute.

Argentina was losing her cheese market in 1947 when operations of the Argentine state trading monopoly, IAPI, tended to make trading uneconomic. But after complaints from the industry caused cheese to be placed once more on a private basis, sales again soared.

In the first six months of this year, Argentina sent 5,459,674 lb. of cheese to the U. S., for a value of $1,817,772. During the whole of 1947, under state trading regulations, only 3,890,742 lb. were shipped.

SCHEDULE OF EVENTS

December

1– 3—National Association of Manufacturers, 53rd congress of American industry, and annual meeting, Waldorf-Astoria, New York City.
1– 4—Refrigeration Research Foundation, southeastern training conference for warehouse personnel, Thomas Jefferson Hotel, Birmingham, Ala.
5– 8—American Society of Refrigerating Engineers, 44th annual meeting, Statler Hotel, Washington, D. C.
8–10—Northwest Frozen Foods Association, Olympic Hotel, Seattle, Wash.

January 1949

5– 7—Michigan State College, annual cannery and fieldmen's conference, East Lansing, Mich.
10–14—American Society of Mechanical Engineers and Materials Handling Institute, 3d national exposition and A.S.M.E. conference, Convention Hall, Philadelphia.
11–14—National-American Wholesale Grocers Association, annual meeting, Atlantic City, N. J.
14–20—National Canners Association, 42nd annual convention, Convention Hall, Atlantic City, N. J.
15–19—Canning Industry and Supplies association, annual exhibit, Convention Hall, Atlantic City.
24–28—American Society of Heating and Ventilating Engineers, 9th international exposition, International Amphitheater, Chicago.

February 1949

6– 8—Institute of American Poultry Industries, fact finding conference, Municipal Auditorium, Kansas City, Mo.
7–10—American Warehousemen's Association, 58th annual meeting, Fairmont and Mark Hopkins Hotels, San Francisco.
15–17—Michigan State College, technical school for pickle and kraut packers, East Lansing, Mich.

Changes in Food Supplies

Production

Creamery butter production, estimated at 96,075,000 lb. during September, was at the lowest level for the month since 1922. Output was 5 percent smaller than Sept. 1947 and 18 percent under the 1942-45 average for the month. Production for the first nine months of this year was 13 percent below the same period in 1947, and 21 percent under the January-September 1942-45 average.

Ice cream produced in September was estimated at 54,145,000 gal.—12 percent under the September output last year, but 9 percent more than the 1942-46 average for the month. The August-September seasonal decline was 15 percent, compared with 19 percent last year, and a five-year average decline of 14 percent.

American cheese production in September was 19 percent under the August output, but only 1 percent below Sept. 1947. Estimated at 71,175,000 lb., the total was 5 percent above the recent five-year average for the month. Except for 1947, production was the highest for the month on record.

Evaporated milk produced in September totaled 274,050,000 lb., 26 percent above Sept. 1947 and 10 percent above the five-year average for the month.

Canned condensed milk production was estimated at 10,000,000 lb. in September, which was less than half the output during September a year ago, but 7 percent higher than the recent five-year average.

Green peas canned during 1948 came to 23,356,000 cases, on a 24/2's basis, in the estimates of the National Canners Association. This is a drop of 28 percent from the 33,110,000 cases packed in 1947.

Red pitted cherries canned this year totaled 3,552,210 actual cases, 48 percent more than the 1947 pack of 2,396,834 cases.

Liquid egg production came to 17,752,000 lb. in September, compared with 10,350,000 lb. turned out in September last year.

Dried egg output totaled 3,692,000 lb. in September, as against 184,000 lb. produced in Sept. 1947.

Frozen egg production, estimated at 3,692,000 lb. in September, was 58 percent below the 9,163,000 lb. produced in September last year.

Poultry canned or used in canning during September reached 10,627,000 lb. —84 percent more than was so used during the same month last year, and 40 percent more than in Sept. 1946. The quantity canned or used in canning during the first nine months totaled 108,027,000 lb., an 80 percent increase over the amount used in the same 1947 period.

Lard production in September dropped slightly under August. Output for the month totaled 97,106,000 lb., compared with 106,717,000 lb. for the previous month.

Farmers stock peanuts milled during September reached 102,000,000 lb., the largest output for the month on record, comparing with 48,000,000 lb. milled during Sept. 1947.

Stocks and Storage

Canned condensed milk stocks were computed at 686,000 lb., on Sept. 30, sharply below the 1,392,000 lb. estimated a year earlier.

Frozen fish and shellfish, held on Oct. 1, totaled 140,360,703 lb. 3 percent higher than the 135,869,745 lb. held a year earlier.

Freezer and cooler occupancy remained below the five-year average level during September, reaching 86 percent for freezers and 71 percent for coolers. This represented a decline, during September, of 1 percent in each case.

Indexes

Business Week's index of business activity stood at 198.7 for the week ending November 6, which was the same as the preceding week, but was up from 195.4 a month previous, and 189.8 a year ago.

The commodity price index on food compiled by the New York Journal of Commerce was down to 192.6 for the week ending November 13, compared with 193.7 for the previous week, 201.8 for October, and 205.3 for November, 1947.

CONSTRUCTION

	Pending (thousands)	Awarded Nov. (thousands)	Total Awarded 1948 (thousands)
Bakery	$1,268	$202	$10,012
Beverages	3,300	....	17,560
Canning and Preserving	.....	.....	400
Cold Storage	150	80	1,629
Confectionery	.....	.....	2,335
Grain Mill Products	420	239	11,424
Ice Manufactured	60	.....	70
Meats and Meat Products	400	.....	2,417
Milk Products	8,393	120	6,740
Miscellaneous	886	1,536	18,278
	$14,877	$2,177	$70,865

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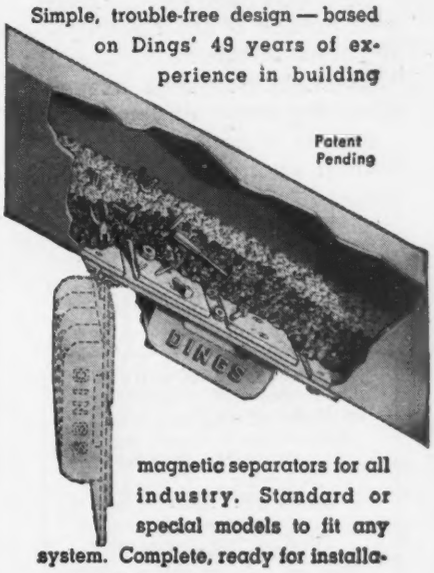
New DINGS ALNICO PERMA•PLATE MAGNET

For Removal of Tramp Iron

It's the lightest . . . most powerful . . . least expensive Alnico magnet available. Highest grade Alnico . . . magnetic permanence guaranteed for mechanical life of installation! Simple to install in chutes, ducts, pipes and above belts. Non-electric . . . no operating or maintenance expense . . . easy to clean. Removes tramp iron from all dry products — protects machinery . . . prevents fires and explosions caused by tramp iron sparks . . . keeps products iron-free. Simple, trouble-free design — based on Dings' 49 years of experience in building



magnetic separators for all industry. Standard or special models to fit any system. Complete, ready for installation. Quick delivery. *Write for new bulletin.*

DINGS MAGNETIC SEPARATOR CO.
4741 W. McGeogh Av., Milwaukee 14, Wis.

Only manufacturer of a complete line of Permanent and Electro Magnets for every purpose.

"Since 1899"
Dings
"HIGH INTENSITY"

- **Inherently Self-Governing**
- **Quiet and Vibrationless**
- **Only One Moving Part . . .**

Power consumption varies with the load and a constant pressure is maintained through the entire capacity range.

Only two bearings—located well outside of the housing—require lubrication.

External bearings assure clean dry air at all times.

Ample clearances permit normal quantities of dust to pass through the machine without harmful effect.

The impeller assembly—the only moving part—is accurately balanced.

Allen-Billmyre Blowers and Exhausters are highly efficient for Agitation and Aeration . . . Manufacture of Gases, Acids . . . Combustion Processes . . . Conveying . . . Cooling and Ventilation . . . and all low Pressure and Vacuum Requirements

Made in wide range of sizes for ½ to 200 HP

FREE!

Send for Bulletin B-5. Describes Blowers and Exhausters . . . their application and specifications.

ALLEN-BILLMYRE DIVISION

LAMSON CORPORATION

551 Lamson St. Syracuse, N.Y.

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

NEW CONGRESS—President Truman welcomes a brand new Congress early in January—new faces and new organization. Every bill of the old Congress will have died with the year. Every bit of legislation must start over again with a new bill. Those who thought that some act was nearing passage last summer must remember that all of the good work that brought their favorite measure up to that situation must be done over again in the new committees. Bills that were well advanced last June will probably move forward rather readily. But planning and pushing must start again—and continue—if enactment is to be had.

A BAD STOCK PILE—Food engineers and executives can well study and apply a recent pronouncement by Navy Industrial Association. In telling what it stands for, NIA said it "believes that we must not stock-pile obsolescence." Far too many food companies apparently do stock-pile their old bad habits. When we write our New Year's resolutions, it might be smart to include a short paragraph against perpetrating the worn-out technical and economic habits of our past. They represent our industries' unwanted ways of the past.

KEEP THOSE RECORDS!—Sugar price control records of many types must not be destroyed until after Oct. 31, 1950. This is the official ruling of the Secretary of Agriculture. If in doubt, better get a clearance before burning the old papers, since they may be needed to defend some company action.

"GHOST ORDERS"—Food companies do not need orders from Washington as a practice run to see whether they can make good food which Uncle Sam might need to buy during military emergency periods. But they may well need the trial orders from one of the military departments in order to prepare adequately for special packaging of special foodstuffs. Procurement offices of the Armed Services are now able to place such small orders for education of industry. When the military comes asking for special development work, it will be smart to offer cooperation conditioned on the placing of an order to try out new plans that may result from small experiments. Without such semi-commercial trials, one really does not know whether new products or new packages are really ready for the services. And it is up to Uncle to pay for the proving in this manner.

INSPECTION SERVICE—Production & Marketing Administration now offers a wider inspection service on a voluntary basis than has ever before been available to food industry. Previously, such inspection service for grain products has been limited to the goods bought by the government. Now the service is offered for these products—including flour, cereals, vegetable oils, soya products, foods, and the like, which are offered for sale on commercial contracts in domestic trade and for export. Proposed regulations governing this activity were promulgated at the end of October. It was then confidently expected that in some cases inspection service might be warranted commercially, by December 1.

BATTLE CONTINUES—The sugar producing industry is again out with a critical comment on dextrose, and the sweetener-using industry will be interested in this. If nothing else, the new pamphlet, "Sugar and Dextrose—A Comparison," will remind them to study for each formula problem whether they are using the proper proportions of dextrose and sucrose. Many will recognize in this competition a further necessity for review and possible formula changing to get the optimum proportioning of sweeteners.

BIGGER DRINKS—Consumption of milk in the household has increased markedly during the past decade. A recent survey by the Bureau of Agricultural Economics gives us a new basis for estimating this important factor in the dairy business. From 1941 or 1942 to 1947, the increase in per capita consumption of fluid milk in practically all eastern markets except Philadelphia was very great. The

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

Old Address .....

New Address .....

New Company Connection .....

New Title of Position .....

increases ranged from 49 percent in Buffalo to 16 percent in New York City. Only Philadelphia lagged; but even there the per capita use of milk was 4 percent greater last year than it was five years earlier. It happens that cream did not do quite as well. In fact in a number of urban centers the sales of fluid cream declined somewhat. But this was far more than offset by the increased use of milk. Today, more than ever before, milk is a major basic factor in the urban family diet.

"ESCAPE CLAUSE"—Congress realized last winter that with improvement of world situations there might be so great an increase in imports of goods that injury or threat of injury might be caused to domestic enterprise. It provided means for forcasting such difficulties and appraising them when they occurred. It provided further that any tariff rate which has been changed by executive order might be restored to the former higher tariff to prevent such injury. Now there have been established new rules of procedure under which the Tariff Commission will proceed to investigate such cases. If any food enterprise fears such injury it is important to initiate a request for investigation by the commission at the earliest date when such injury may appear in fact or in prospect. It takes time to carry out the procedure. Hence, complainants should not wait until injury has actually occurred before asking that the "escape clause" be invoked.

SELF-SUFFICIENCY—Numerous food stuffs are strategic or critical or essential materials in the military sense. As yet we have not developed domestic equivalents for most of these as we have developed synthetic rubber which can take the place of most of our former requirement of natural rubber. It is an intriguing thought that perhaps some day we will have the equivalent of a synthetic banana, or tea or cocoa or coffee. Perhaps the closest that we have come in the food business is to make synthetic spice materials which can sometimes be used very acceptably instead of nutmeg, pepper, and other aromatics from abroad. Any research director who runs out of ideas for investigations (unlikely, if he is a bright fellow) might tackle the banana or the beverage problem.

OVERTIME RULES—Calculating pay for overtime of workers getting special bonuses for night, holiday, or Sunday work now requires use of the special pay as base pay in calculation. Department of Labor officials began enforcing this new ruling of the Supreme Court during October. It took four months after the original Court judgment to be sure that a request of review and re-hearing was not going to be granted. Now the overtime calculated on special rates is the rule which Wage-Hour Division enforces. This has been erroneously called "overtime-on-overtime." Actually, it is not that at all. It simply uses the actual special rate as the base.

FORTIFY
ALL your MILK
WITH
Deltaxin*
TRADE MARK REG. U.S. PAT. OFF.
WINTHROP-STEARNS' BRAND OF CALCIFEROL

PURE CRYSTALLINE VITAMIN D_2

Deltaxin provides Vitamin D_2 in its purest, most potent form for the fortification of fluid milk and other foods. An outstanding Vitamin D concentrate, Deltaxin in propylene glycol offers you these advantages:

PURITY Deltaxin is the purest known form of Vitamin D_2.

ECONOMY Costs less than one cent per 100 quarts of milk. No extra equipment necessary.

ACCURACY Propylene glycol as solvent insures rapid and thorough dispersion, unvarying antirachitic potency.

STABILITY Does not become rancid; does not alter color, odor or taste of milk; not affected by pasteurization or homogenization.

CONVENIENCE Simply "measure-and-add" direct to milk any time before pasteurization.

The Council on Foods and Nutrition of the American Medical Association has declared Deltaxin in propylene glycol suitable for the fortification of Council accepted vitamin D milk.

OTHER SPECIAL MARKETS DIVISION PRODUCTS

B-E-T-S* — The original Food-Enrichment Tablet for Bread and Macaroni Products.

VEXTRAM* — The First Starch Base Mixture for Enrichment of Flour, Corn and Macaroni Products.

OXYLITE* — An Improved Flour Bleaching Agent.

TRIDEE* — Vitamin D_3, Activated 7-dehydrocholesterol, for Vitamin D Fortification of Animal Feeds.

PURE CRYSTALLINE VITAMIN D_3 — For Fortification of Evaporated Milk.

ASCORBIC ACID — To retard browning, retain flavor of Frozen Fruits.

Pure Crystalline Vitamins in Bulk

Vitamin B_1 — Niacin
Vitamin B_2 — Niacinamide
Vitamin B_6
Calcium Pantothenate

LIGNIN VANILLIN C. P. U. S. P.

ROCCAL* — powerful sanitizing agent; the original quaternary ammonium compound.

*Trade Marks Reg. U. S. Pat. Off.

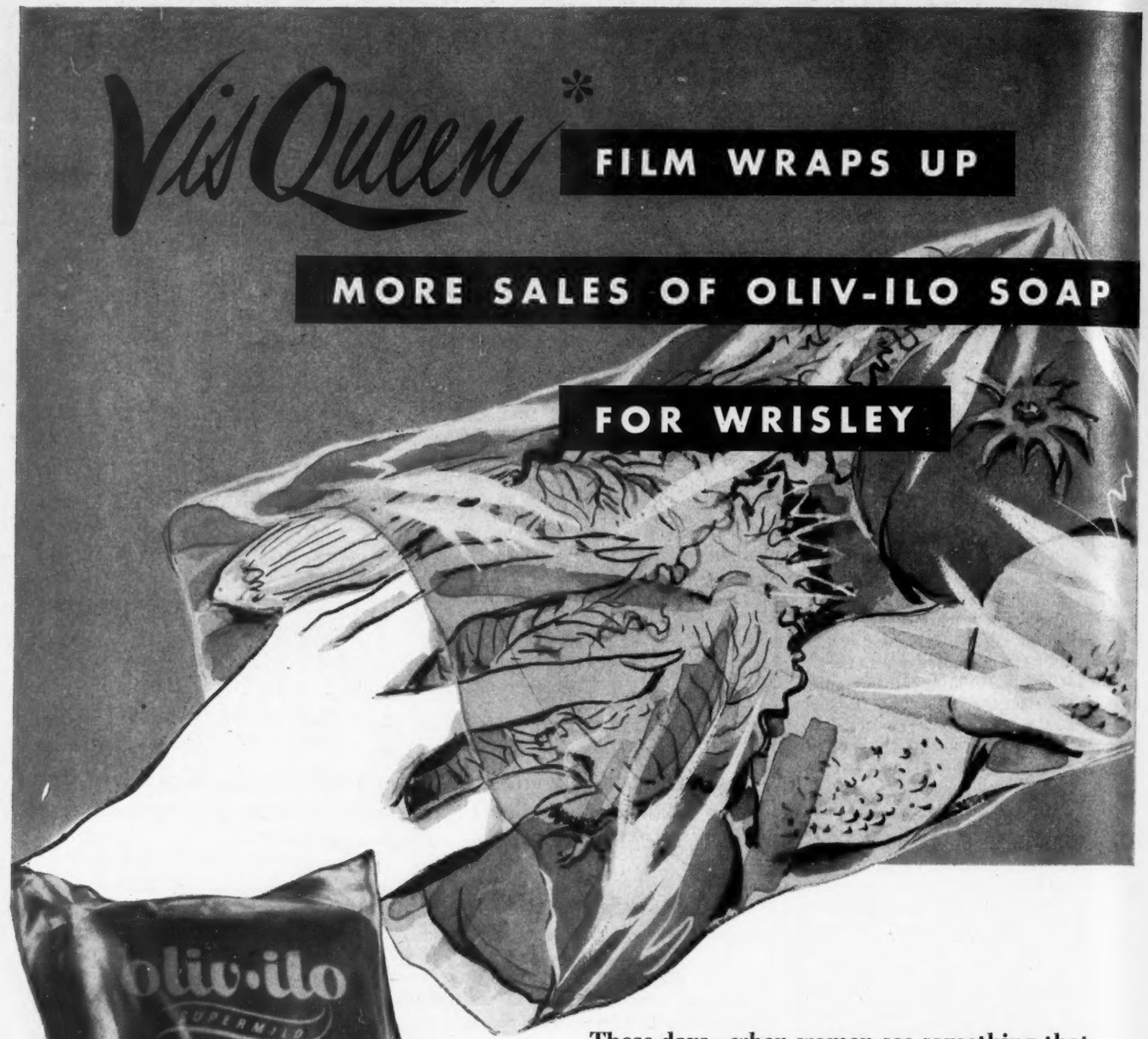
Sold in four convenient sizes for small and large dairies.

SPECIAL MARKETS—INDUSTRIAL DIVISION
Winthrop-Stearns INC.
170 VARICK STREET, NEW YORK 13, N.Y.
*Sole Manufacturer Under U. S. Patents 1 902,785 & 2,030,792

VisQueen* FILM WRAPS UP

MORE SALES OF OLIV-ILO SOAP

FOR WRISLEY



Package produced by Flexible Package Co., Chicago, Illinois.

*T. M. The Visking Corporation

These days—when women see something that offers more for their money—they GO for it fast!

So when Wrisley wrapped up 3 bars of Oliv-ilo Soap in a smart-looking VISQUEEN film food bag—priced the package right—no wonder sales went a-zooming!

If you have a packaging problem that calls for the modern approach—find out what VISQUEEN film can do for you. It is waterproof, airproof, greaseproof, washable—100% pure, tasteless, odorless. Write us for samples and complete information.

VisQueen FILM A PRODUCT OF

THE **VISKING** CORPORATION

PRESTON DIVISION • TERRE HAUTE, INDIANA

MEN • JOBS • COMPANIES

GEORGE F. KAY

Appointed director of production, research, and engineering of the White Rock Corp., he has had 20-yr. experience in beverage field. He is co-discoverer of method for making glucose sugar from cotton.

OSCAR A. SAAR

Elected president of American Molasses Co., he first joined the firm in 1907 as an office boy. Directors also selected Adolf A. Berle, former Assistant Secretary of State, to become board chairman.

LEON A. CHAPIN

Recently elected president of the Dairymen's League Cooperative Assn., succeeding the late Henry H. Rathbun, he has been a prominent farm leader in state, regional, and national activities.

INDUSTRY

American Bakeries Co. is reported to be making plans for construction in Birmingham, Ala., of a $1,000,000 one-story, modernized plant to manufacture cracker and biscuits.

Braden Cake Shop's new $127,000 plant in Dallas, Tex., has begun production of bakery products to supply the firm's retail outlets.

Carnation Co., Toronto, Ont., Canadian subsidiary of the U. S. firm, has begun the installation of new machinery valued at $250,000 in its plant at Aylmer, Quebec, in order to double the evaporated milk capacity.

Kraft Foods Ltd., Outremont, Quebec, has completed building a new plant at Williamstown, Ontario for the production of cheddar cheese and specialty foods. It is estimated that cheese production during the summer will be about 5,000 lb. daily.

Hunt Foods Inc. of Los Angeles has announced purchase of E. Pritchard, Inc., New Jersey food processing firm. The Pritchard plants located at Bridgeton and Winslow, N. J., will enable the western firm to supply eastern markets without penalty of heavy cross-country transportation costs.

Dodge & Olcott, Inc., essential oil and drug house in New York City, recently celebrated its 150th anniversary. Chairman of the board, Francis T. Dodge, is a grandson of one of the original founders and has been with the firm for over 44 yr.

Industrial Sugars, Inc., is a newly formed corporation to engage in the production of refined liquid sugar. Company has a capitalization of $500,000, which includes the combined assets of the American Syrup & Sorghum Co. of St. Louis. The refining process that will be used has been developed and perfected by American Cyanamid Co.

Island Packers, Inc., a Delaware corp., is reported to be negotiating with the Navy Dept. for the establishment of a tuna canning plant in American Samoa.

Libby, McNeill & Libby is reported to have purchased the western part of the WAA disposal center in Hammond, Ind., for $497,000. Property includes 34 acres of land and a one-story building.

McClain Industries, operating plants at Morgan City and Verdanville, La., has launched a national promotion on a new line of frozen fresh-water fish products marketed under the "Teche" brand.

Michigan Bakeries, Inc., is reported to have started construction of a $1,250,000 plant in Grand Rapids, Mich. New equipment will be designed for automatic control from raw materials to finished product.

Rosenberg Brothers, San Francisco, has become a subsidiary of Consolidated Grocers of Chicago. The merger was disclosed in a report to SEC. Rosenberg Brothers was purchased about a year ago by Cummings Corp., a holding firm formed for the purchase and headed by Nathan Cummings, chairman of Board for Consolidated Grocers.

Packed Products Corp. has leased a building in Waverly, Ohio, and is setting up equipment to spice, cure and package smoked and salted herring imported from Nova Scotia. Production will be carried on under a license issued by D'Arcy Holderness & Co., Cuban concern which developed process.

Seymour Produce Co., Topeka, Kan., has purchased the $150,000 packing plant of the McKinley Produce Co. of Greensburg, Ind.

Snow Crop Marketers, Inc., division of Clinton Industries, Inc., has acquired control of Juice Industries, Inc., Dunedin, Fla. B. C. Skinner will continue as chairman of board and general manager of Juice Industries, while C. W. Metcalf, vice-president of Clinton and chairman of board of Snow Crop, becomes president and a director of Juice Industries.

Vacuum Foods Corp., producer of Minute-Maid concentrated frozen orange juice, has begun processing for the 1948-49 season in its new $2,500,000 plant at Plymouth, Fla.

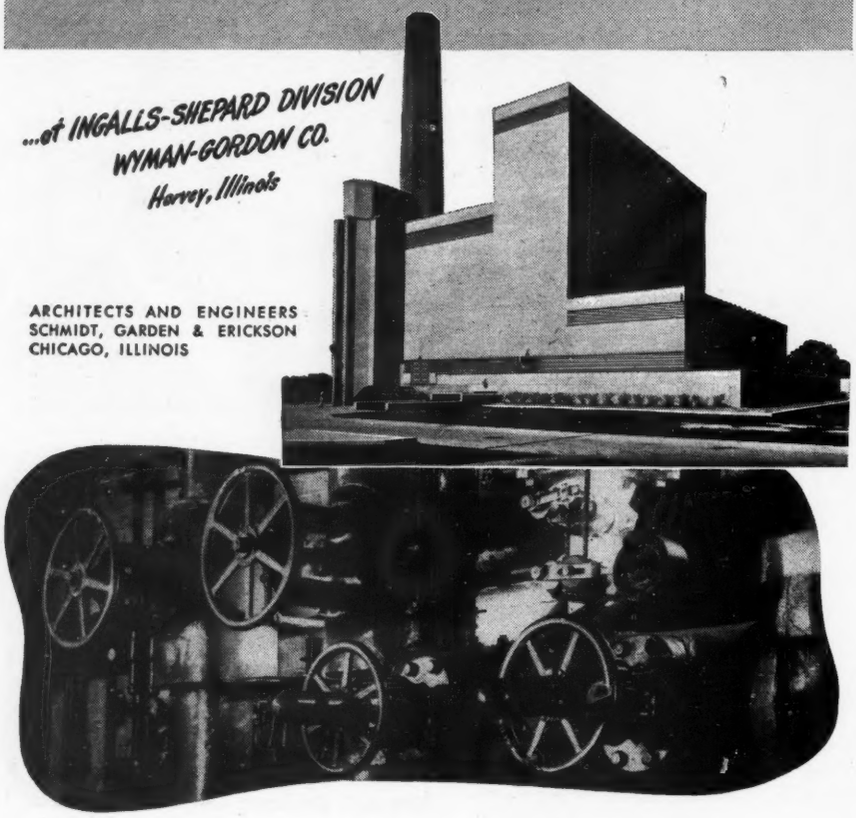
Wolf Baking Co., Lafayette, La., has opened a new $800,000 plant with 73,000 ft. of floor space.

Fire Losses—Armour Creameries and the Royal Crown Bottling Co, both located in the Stevens Building in

modern plant design includes LUNKENHEIMER VALVES

...at INGALLS-SHEPARD DIVISION
WYMAN-GORDON CO.
Harvey, Illinois

ARCHITECTS AND ENGINEERS
SCHMIDT, GARDEN & ERICKSON
CHICAGO, ILLINOIS



Housed in a strikingly modern, all-reinforced concrete, windowless building, the power plant of this manufacturer's forge shop is a picture of modern efficiency. The list of principal suppliers reads almost like "Who's Who" of power house equipment manufacturers.

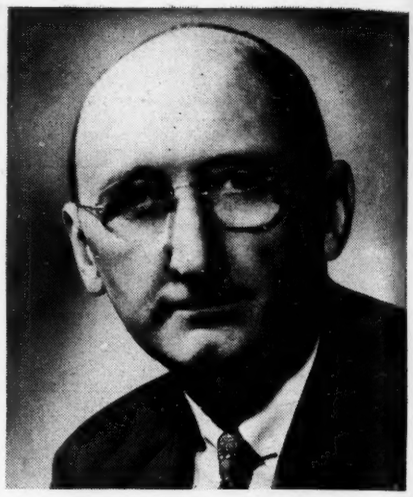
Among these big names is that of LUNKENHEIMER . . . identifying high and low pressure valves that serve in multiple installations on lines and equipment.

The 85-year old LUNKENHEIMER reputation back of a widely varied line of quality valves has gained the confidence of planning and operating men alike. That's the reason LUNKENHEIMER VALVES are so often specified for modern installations . . . for long life, minimum maintenance and true, low-cost service.

Lunkenheimer Valves are available through Distributors in all industrial centers.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO. U. S. A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 34
EXPORT DEPT 318-322 HUDSON ST., NEW YORK 13, N.Y.

More Power to Industry Through LUNKENHEIMER VALVES



DR. J. MAX WIDMER

Elected to the newly created position of executive vice-president of Penick & Ford, Ltd., he is noted for his discoveries in the chemistry and production of starches and oils. He holds numerous patents.

Beaver Dam, Ky., were destroyed by fire Oct. 2 with losses estimated at $100,000. . . An explosion followed by fire destroyed one section of the Morton Salt Co.'s refining plant in Grand Saline, Tex., Oct. 30 with estimated loss of $250,000.

PERSONNEL

Franz Biller has been appointed masterbrewer for the James Hanley Co., Providence, R. I. Having been born in the Baden province of Germany, where his parents operated a brewery, he has had almost 30 yr. of brewing experience, including work at Adam Scheidt Co., Norristown, Pa., and the Chester Brewing Co., Chester, Pa.

G. J. Cox, formerly in charge of research dept. of the chemical laboratory, Corn Products Refining Co., Argo, Ill., is now a professor of dental research at U. of Pittsburgh.

A. A. Eckerson, who for more than 40 yr. has been associated with the margarine business in Jersey City, has been appointed manager of the Swift & Co's. meat packing plant in that city. He replaces H. W. Tenney, who has been assigned to the Swift general office in Chicago.

Robert M. Green, formerly on the staff of the industrial consultant firm of Glenn G. Hoskins, Chicago, has been appointed head of an industry-wide macaroni and noodle products promotional program to be launched by the National Macaroni Manufacturers Assn.

Herbert S. Madsen, formerly staff technologist of the N. Y. headquarters staff of General Foods Dept. of Re-

For BETTER TEMPERATURE CONTROL

GET A COPY OF NEW BULLETIN 329

It will help make it easy for you to select the simplest, most dependable type of control made for many of the following applications:

Water Heaters • Hot Water Line Control • Cooking Vats Tanks • Kettles • Dryers • Pasteurizers • Blanchers Stills • Bottle and Can Washers • Smoke Houses Sausage Cooking and Steaming Cabinets • Dough Rooms and Proof Boxes — and many other uses (11DF)

Quickly Pay Back Their Cost

Controlling heating operations they prevent OVER heating—save fuel and labor—improve production

Controlling cooling water for diesel, gas engines and compressors they help prevent OVER and UNDER cooling—increase operating efficiency and reduce con sumption of cooling water

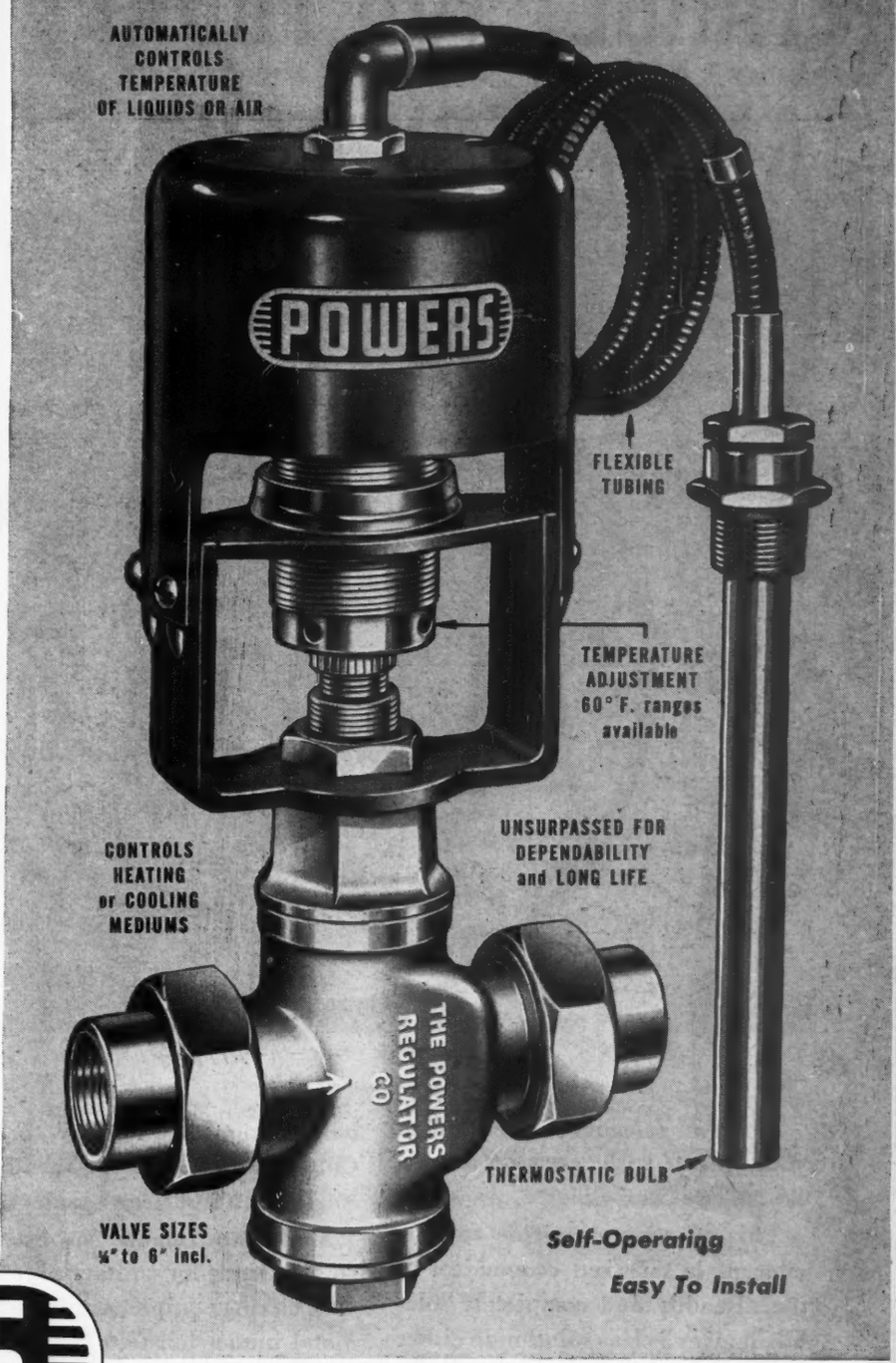
TYPES AVAILABLE: Direct and reverse acting regulators—Double Seat balanced valve, double unions ½" to 2" incl., flanged 2½" to 6" incl.—Single Seat valve double unions ¼" to 1½" incl.—3-Way valve ½" to 4" incl.—Temperature Indicating regulator—all are shown in new Bulletin 329. Get a copy and prices from our nearest office.

Use

POWERS

No. 11 INDICATING REGULATOR

Combining an easy to read dial thermometer with a self operating regulator was pioneered by POWERS in 1930. Thermometer has 4" dial and is mounted on top of the regulator. Both thermometer and regulator operate from same thermal system. Only one tapped opening required. A visual check on performance of the regulator is provided and it is easy to adjust for different temperatures.



No. 11 REGULATORS

When you want a simple, rugged control to maintain a constant temperature with unfailing dependability . . . install a POWERS regulator. They often give 10 to 25 years of service and pay back their cost several times a year. No compressed air or electricity required. May be just the regulator to solve some of your temperature control problems. ***Write for Bulletin 329.***

CHICAGO 14, ILL. 2720 Greenview Ave. Phone BUckingham 1-7100
NEW YORK 17, N. Y. 231 East 46th St. Phone ELdorado 5-2050
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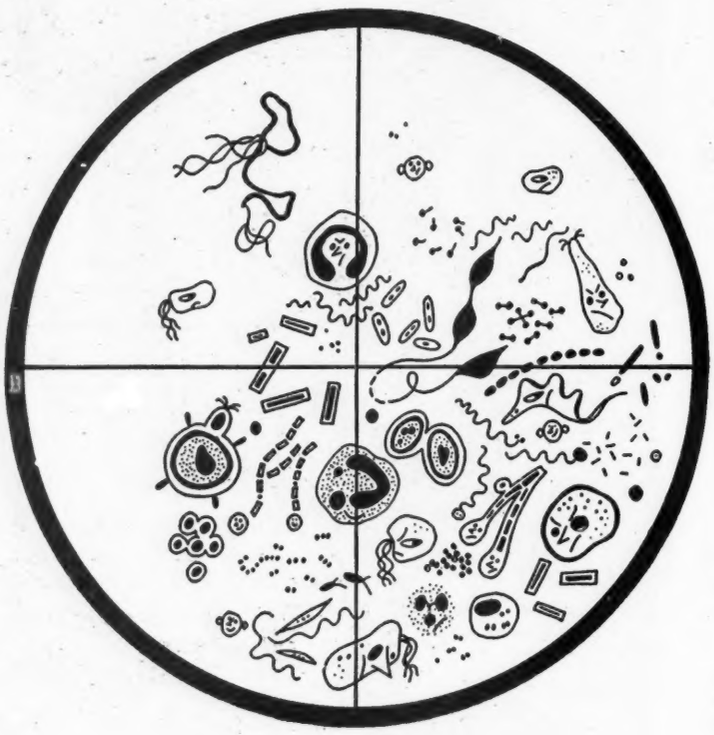
THE POWERS REGULATOR CO.

OFFICES IN 50 CITIES • SEE YOUR PHONE BOOK

*Over **55** Years of Temperature and Humidity Control*

TARGET FOR TODAY AND EVERY DAY



You can safeguard sanitation in your plant with germ-destroying *Wyandotte Steri-Chlor**.

This effective germicide and deodorant is safe and economical to use. Readily and completely soluble, it gives a clear solution in either hard or soft water. It holds its strength in solution at low as well as high temperatures and there is a simple method for determining the proper strength.

The value of Steri-Chlor as a deodorant is demonstrated by the "onion smear test" on a person's hands. A quick washing with Steri-Chlor and the odor is gone; hands smell sweet and clean again.

Steri-Chlor makes an excellent rinse or spray for sanitary pipe lines, vats, mixing equipment and utensils. Metal immersion tests have proved it is safe to use on this and other equipment. It is invaluable, too, as a germicidal rinse for workers' hands.

We'll be glad to furnish you with a sample of Wyandotte Steri-Chlor at your request. Why not write today?

*Registered trade-mark

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • Service Representatives in 88 Cities

Wyandotte
REG. U. S. PAT. OFF.

search & Development, has been transferred to Hollywood, to become manager of Bireley's Citro-Mat Lease Dept.

Robert G. Ruark, formerly Corn Products research fellow at Mellon Institute of Industrial Research, Pittsburgh, has been made assistant to the general manager, chemical division, Corn Products Refining Co., Argo, Ill.

R. W. Smith, after more than 23 yr. with Swift & Co. in many phases of refinery operations, has resigned to become a vice-president of Blanton Co., St. Louis.

Harold H. Swift has been elected chairman of the board of Swift & Co., Chicago, to succeed his brother Charles, who died Sept. 30. He is the youngest son of the founder, Gustavus F. Swift, and has been vice-chairman for the past 11 yr.

Dr. A. W. Turner, formerly with Forbes Laboratories, Inc., has joined the laboratory staff of A. E. Staley Mfg. Co. to work in the fermentation division. Elliot W. Amon, formerly with Peznay Mfg. Co. of Mercer, Pa., is now a junior research chemist with the Staley firm.

Quartermaster Food & Container Institute for the Armed Forces, Chicago, has announced the following appointments: Dr. G. H. Berryman, formerly Commanding Officer and Director of Research of Surgeon General's Medical Nutrition Laboratory, becomes head of the QF&CI's Nutrition Branch; Dr. Harry Spector, formerly faculty member U. of Illinois, joins the research staff; and Dr. K. T. Schwartz and Jack Mayer have joined the Animal Products Branch.

ASSOCIATED INDUSTRIES

The Atlas Mineral Products Co. has announced the resignation of W. L. Sheppard, Jr., advertising manager, who has accepted a position as technical advisor to Tanks & Linings, Ltd., Town Wharf, Droitwich, Worcestershire, England.

The Hinde & Dauch Paper Co., Richmond, Va., has purchased land on the Petersburg Pike for the construction of a new corrugated box factory, which will employ 100 people.

Jessop Steel Co. has announced the appointment of E. E. Bradberry assistant manager of sales in the Chicago office. He has wide experience as a stainless steel engineer.

The Patterson Foundry & Machine Co. has appointed Donald Q. Kern as director of engineering of its Process Engineering Division.

What will yours be?

*Any sundae becomes something special when *Sea Breeze nuts and fruits are used at the fountain. In a way, it's too bad that these products aren't served right out of these attractive jars. They have worlds of taste appeal . . . and eye appeal, too. Take a look at those closures, for instance. They're Crown Screw Caps, colorfully lithographed to match the labels . . . a mighty attractive package.*

**Products of the Service Fruit Flavor Manufacturing Co., Paterson, N. J.*

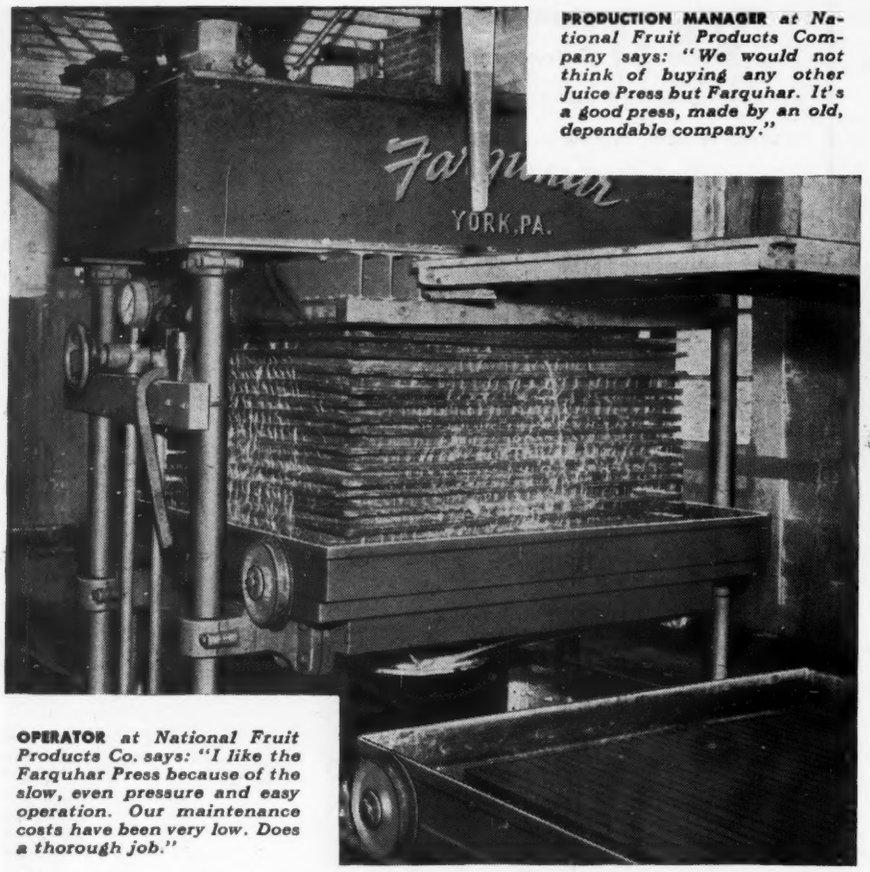
At the Canners' Convention in Atlantic City, Crown will be at Booth E-23, Convention Hall, January 16-21.

In addition to the fact that they are exceptionally well made, Crown Screw Caps have features that the consumer can't see . . . things like the patented Deep Hook Thread that gives extra sealing pressure, and special liners that safeguard product quality and flavor.

Packers who use Crown Closures know that these features make a real difference and that they can count on them for complete sealing satisfaction. Crown Cork & Seal Company, Baltimore 3, Maryland. *World's Largest Makers of Metal Closures.*

CROWN CLOSURES

Approved by Millions of Housewives



PRODUCTION MANAGER *at National Fruit Products Company says: "We would not think of buying any other Juice Press but Farquhar. It's a good press, made by an old, dependable company."*

OPERATOR *at National Fruit Products Co. says: "I like the Farquhar Press because of the slow, even pressure and easy operation. Our maintenance costs have been very low. Does a thorough job."*

FARQUHAR Juice Presses

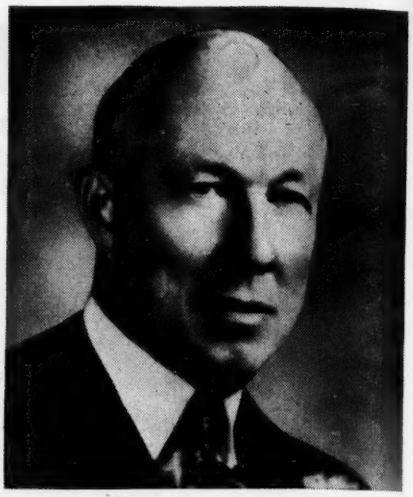
Give you more juice per bushel! — Save you processing time!

Twenty Farquhar Hydraulic Juice Presses speak for themselves in increased production and bigger profits for the National Fruit Products Company. The installation cited here shows why Farquhar Juice Presses are standard equipment throughout the apple processing industry. It's a fact that Farquhar Presses give you more juice per bushel of fruits and vegetables because they work at much higher pressures than ordinary presses. Whatever the size of your processing operation, there's a Farquhar Press to fit your needs. The Farquhar Food Processing line also includes *Hi-Pressure Cleaning Units,* to cut costs by washing down vats, belts, coolers, tanks, floors . . . *Spray Coolers,* for continuous cooling of glass-packaged fruits, juices, catsups, jellies . . . *Trimming Tables, Pasteurizer-Coolers* and *Conveyors.* Let us know how we can help you with your processing.

Write: A. B. Farquhar Company, *Special Machinery Division,* 402 Duke St., York, Pa.

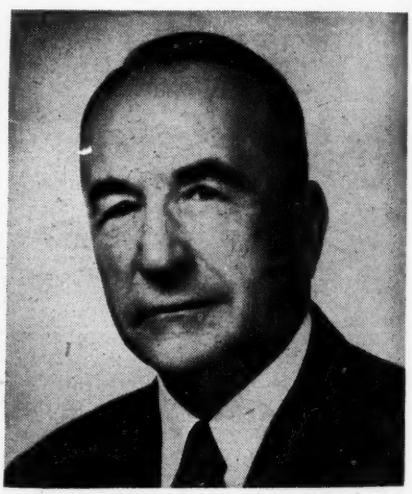
Farquhar **FOOD PROCESSING MACHINERY**

JUICE PRESSES • SPRAY COOLERS • CLEANING UNITS
TRIMMING TABLES • PASTEURIZER-COOLERS • CONVEYORS



A. W. Eames Dies . . .

President of California Packing Corp., second vice-president of NCA, and director of Alaska Packers Assn., Alfred W. Eames died Oct. 28 in San Francisco at the age of 62. His father pioneered the Hawaiian pineapple industry.



. . . And Pratt Now Heads Cal-Pak

At a special meeting of board, Roy L. Pratt was elected new company president. Starting in 1903 with Griffin & Skelley, which later joined with other firms to form Cal-Pak, he has a broad background in the canning and packing business.

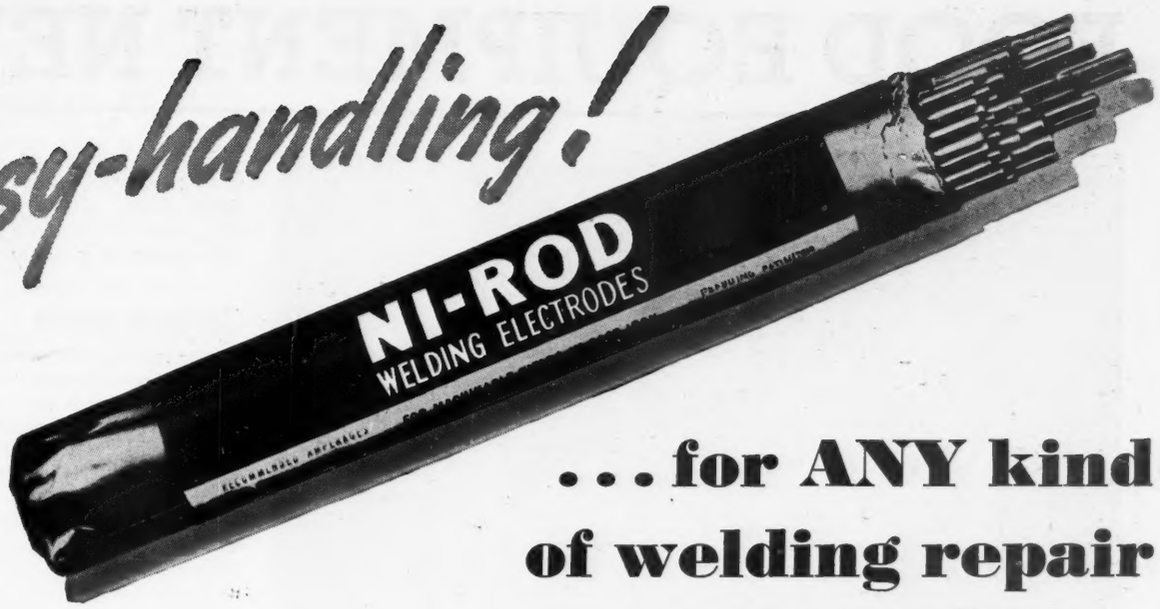
DEATHS

Faber A. Bollinger, executive secretary of Southern Bakers Assn., Inc., at his home Atlanta, Oct. 9.

C. H. Warfield, 81, former president of My-T-Fine Corp., in Middlesex, N. J., Nursing Home after a long illness, Oct. 26.

Dr. Fred D. Warmsley, 66, former president of Chicago milk division of the Borden Co. and also former president of International Assn. of Milk Dealers, at his home in River Forest, Ill., Oct. 20.

Easy-handling!



. . . for ANY kind of welding repair on CAST IRON

Maintenance crews are confidently tackling many jobs they'd always believed impossible.

Today, they're welding cast iron successfully.

They're saving shutdowns and expensive repair work.

How? With Ni-Rod*, the easy-handling electrode. Ni-Rod's qualities of penetration and flexibility keep even the inexperienced welder out of trouble. *It has such outstanding flow characteristics that slight variations in manipulation have very little effect on weld quality.*

With Ni-Rod, you make repairs right in your own plant—often without dismantling equipment. You lay a smooth bead on any part of a casting, whether you weld in a downhand, vertical or overhead position.

In addition, Ni-Rod brings to your on-the-spot repairing of broken or worn castings these six advantages:

- **machinable welds**
- **stable, flutter-free arc**
- **fine wash**
- **excellent bead contours**
- **easily removable slag**
- **smooth, even deposits**
- **operation on AC or DC**

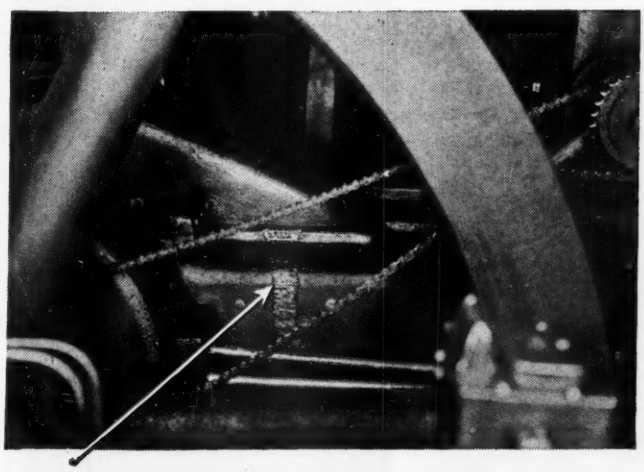
Try a 5-pound package of Ni-Rod. Sizes 3/32", 1/8", 5/32" and 3/16". See for yourself how easy it is to get *good* welds on cast iron. *Reg. U. S. Pat. Off.

Instruction Booklet Sent FREE

Write us for your copy . . . now!

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
INCO NI-ROD
TRADE MARK



SAVED REPAIR TIME! After 25 years on the job, this giant air compressor developed two cracks. One was 14 inches long, the other (arrow) 3½ feet. Both were in a three-quarter-inch-thick section of the base that acted as an oil crankcase.

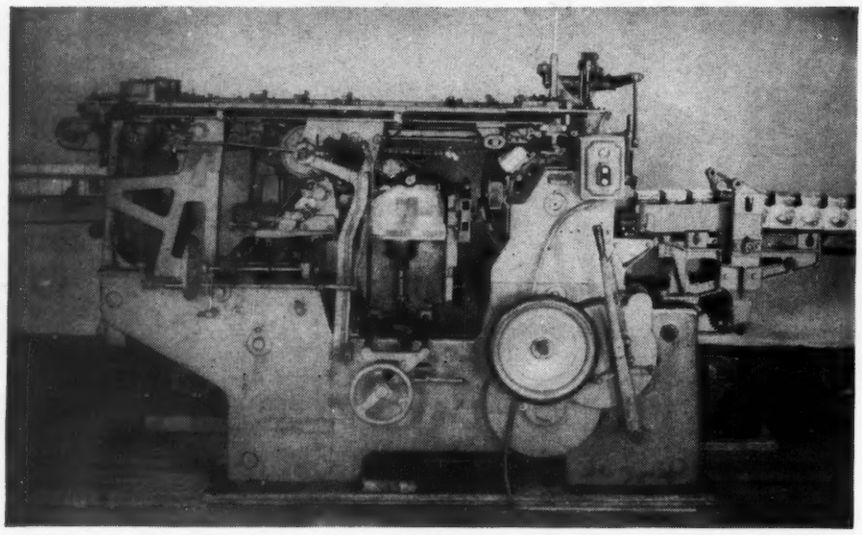
It would have taken a week to dismantle the unit, several days to repair it by ordinary methods . . . plus another week for rebuilding. *Ni-Rod cut that to less than 3 days!*

The cracks were V'd out and cleaned; then skip welded with Ni-Rod until the "V" was slightly above flush. When this photo was taken, the compressor had been back in service over six months . . . and going strong.

NI-ROD IS DISTRIBUTED BY:

WHITEHEAD METAL PRODUCTS COMPANY, INC.
WILLIAMS AND COMPANY
STEEL SALES CORP.
PACIFIC METALS COMPANY, LTD.
EAGLE METALS COMPANY
J. M. TULL METAL & SUPPLY COMPANY
METAL GOODS CORPORATION
ROBERT W. BARTRAM
ALLOY METAL SALES, LTD.
WILKINSON COMPANY, LTD
METAL & THERMIT CORPORATION
HOLLUP CORPORATION
NATIONAL CYLINDER GAS COMPANY

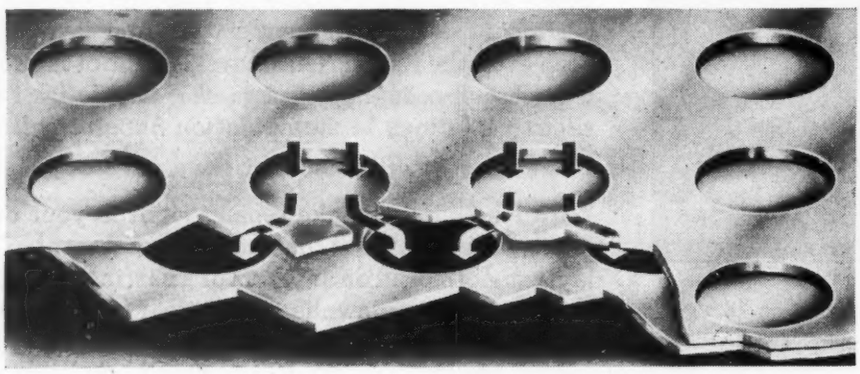
FOOD EQUIPMENT NEWS



Automatic Labeler for Frozen Foods 1

FOR automatically applying a label to filled and frozen metal-end, fiber-body food containers, the Packaging Sales Labeler has been developed by the Packaging Sales Co., Dept. I, Seattle, Wash. Labels are glued all the way around the fiber body, flush with the metal-end bead, and are also lap-seam glued. Cold glues are used. Brushes fit label to container as it turns in machine, which can handle as many as 75 cans a minute.

The unit enables a freezer to use unlabeled containers for his unsold pack and label them with buyer's brand on selling. Previously, fiber containers have been labeled before being filled. New equipment permits use of lithographed, varnished labels with full-color vignettes.



Perforated Sheet Filter Medium 2

ADAPTABLE to all types of filtration equipment—plate and frame, horizontal or vertical leaf, vacuum or pressure—a new metallic filter medium is announced by W. S. Rockwell Co., Dept. I, Fairfield, Conn.

Unit is constructed of two sheets of metal, of desired gage, accurately perforated with holes of about .045 in. dia. spaced to provide about 120 holes per sq. in. One sheet is superimposed on other and so aligned that unperforated portions of top sheet block off holes of bottom sheet. Two sheets are then spot welded together on about 1 in. centers, holding this adjustment permanently.

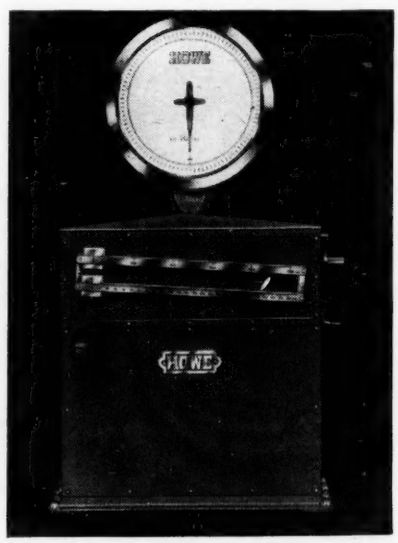
This staggered arrangement of top and bottom holes is such that edges of all holes in top sheet are in very close proximity to neighboring edges of holes in bottom sheet. In effect, a passage for liquids is provided by each hole equivalent to circumference of hole times distance between two sheets. Liquids enter holes of upper sheet, turn at right angles to pass between sheets, then turn again at right angles to pass out through bottom holes. Solids are retained on top sheet, either because they are too large to pass through openings formed by this construction, or because of formation of a filter bed on top sheet, which in turn prevents passage of finer solids. Filter bed may be formed by solids in slurry or with filter aids.

Medium is supplied in any required form—flat, rolled or in special shapes. It is easily formed to fit any type of drum filter, cylinders, disks or other shapes. Unit is made of stainless or other steel, aluminum, bronze, or other metals in standard double thickness of .010 in. per sheet. Sheets of .008 in. and .005 in. are also available for those conditions where such thickness is adequate.

Cabinet Scale 3

DEVELOPED for use with floor, industrial built-in, motor truck, tank and all types of overhead track and suspension scales, a new tape-drive cabinet dial has been announced by the Howe Scale Co., Dept. I, Rutland, Vt. It is termed an extremely flexible and wide range weighing instrument, meeting requirements of heavy, medium and light-duty industrial weighing with equal efficiency. Several basic technical advancements and extensive exterior modernizations are reported.

Outstanding improvement is incorporation of the new tape-drive. This comprises a positive-drive mechanism, using high-strength, non-corrosive special alloy tapes to replace the old style rack and



pinion. Development eliminates inaccuracies caused by gear teeth wear, back-lash and friction. Tape-drive delivers a smooth, positive drive to the pointer and requires only minimum maintenance and service. An adjustable, self-compensating hydraulic dash-pot, using a new valve-type plunger working in "Zero-Flow" oil, controls pointer action and prevents shocks from reaching mechanism.

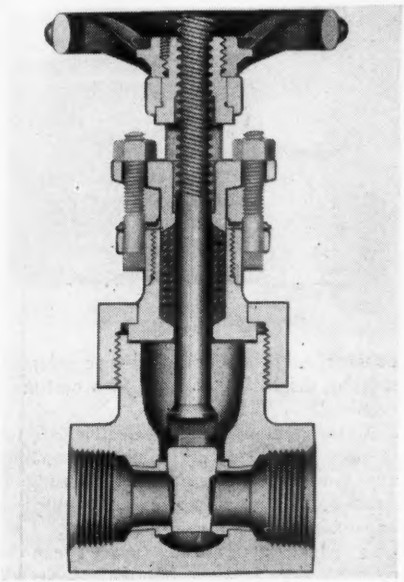
Also incorporated is company's multiple drop-weight system of weight addition. Up to four drop-weights can be quickly put in or taken out of the weighing system, thereby changing capacity of scale by the equivalent of the dial chart for each drop weight added or subtracted.

Small Gate Valves 4

TO MEET a demand for small, compact valves in the 600-lb. class, a new line of union bonnet cast-steel gate valves has been announced by Crane Co., Dept. I, Chicago. New valves have been desig-

nated No. 3602XW and 3602X, and will replace Nos. 3606XW and 3606X, which are being discontinued. Valves are available in sizes ¼ through 2 in., with screwed ends and with two kinds of trim. The 3602XW has Exelloy seats and a hardened stainless steel disk; No. 3602X has both seats and disk of Exelloy.

In sizes ¾ through 2 in., bonnet ring, bonnet and yoke are separate parts; from ¼ through ½ in. these parts are cast in one piece. Joint between body and bonnet is sealed with a soft iron gasket, which is not affected by high temperatures or by any of fluids for which valve is recommended. Valve has an outside



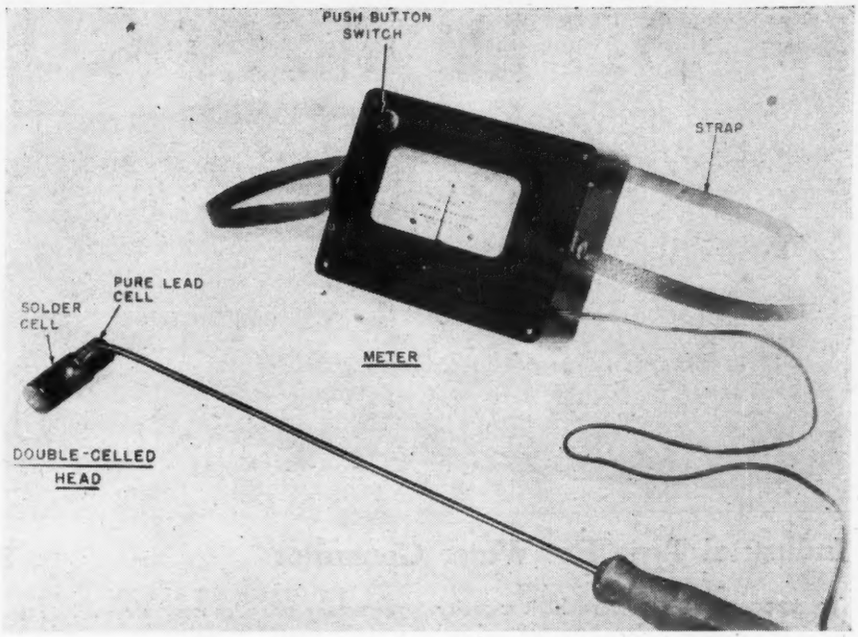
screw and yoke. Special attention has been given to design of stuffing box, which is deep enough on valves over ¾ in. in size to hold six rings of square packing. Gland is held by two T-head bolts fitted into slots in yoke, and it can be adjusted easily.

The XW valves are recommended for superheated or saturated steam, hot or cold water, ordinary air, natural gas, fuel oil, gasoline, low viscosity oil such as is used in hydraulic systems, and for fluids that are non-lubricating and relatively non-corrosive. Top temperature recommendation is 850 F.

Telescopic Lift Truck 5

DESIGNED particularly for the moving and high stacking of materials on skid platforms, pallets, or in sectional bins, the telescopic "JackStacker", 100 percent electrically operated, is announced by Lewis-Shepard Products, Inc., Dept. I, Watertown, Mass. Truck features allow passage through doorways and under trusses or other overhead obstructions. Counter weighted, straddle-type, open-end base, and platform-type models are available for handling single or double-faced pallets as well as skids or platform-type containers.

All controls are operated from handle head with handle in vertical or any other position. It is not necessary to halt the truck in order to raise or lower the lifting carriage.



Tin-Content Determinator Instrument 6

DEVELOPED in research department of Continental Can Co., Kurek Solder Analyzer provides a rapid method for determining tin content of tin-lead solders. Under Government's conservation program, can manufacturers must use a solder low in tin, and to secure best results, they must very carefully control tin content of solder. Formerly, this was done by chemical analysis and by physical tests, both of which methods are rather time-consuming and therefore expensive.

Analyzer operates on principle that alloys of tin and lead have a lower solidifying temperature than pure lead. The greater the percentage of tin, the greater the difference in the two solidifying temperatures. An electric current generated by virtue of difference in temperature actuates a sensitive meter provided with a scale graduated in percentages of tin. The percentage of tin may, therefore, be read directly from scale of instrument. Determination of percentage of tin in solder may be made in two minutes or less by a non-technical employee.

Since percent of tin is read directly from scale of instrument, corrections in tin content of solder pot may be started within a few minutes, instead of waiting for some hours as was the case previously when chemical determinations were necessary. Instrument weighs only 3 lb. It is fitted either with a handle or with a carrying strap.

Continental Can Co. announces that Wheelco Co., Dept. I, Chicago, has been licensed to manufacture this device, and make it available to all can makers.

Tube-Type Motors 7

INTRODUCTION of a new line of tube-type, totally-enclosed, fan-cooled, squirrel-cage motors, ranging from 150 to 600 hp., has been announced by Allis-Chalmers, Dept. I, Milwaukee.

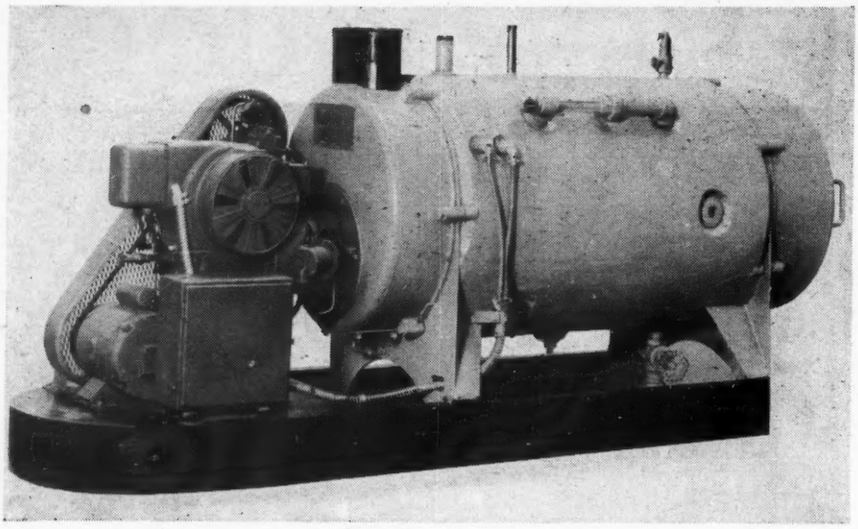
Use of tubular type heat transfers follows, in general, the methods employed in previous motors of larger size built by company.

Internally, new motor is divided into two isolated parts with each side having its own path of internal air circulation. Because of its construction, it is possible, through simple maintenance, to keep motor free of power-destroying agents, which tend to clog air passages in conventional type of fan-cooled motors.

New line is being offered with under writers' labels for 1-D or 2-G locations in ratings of 3600-rpm., 250 to 400-hp., 1800-rpm., 200 to 300-hp., and 1200-rpm., 150 to 200-hp.

WRITE FOR MORE INFORMATION

Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials. Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.



Industrial Type Hot Water Generator 8

To MEET need for modern high capacity hot water heating in large commercial and industrial type applications, Cleaver-Brooks Co., Dept. I, Milwaukee, offers a new hot water generator.

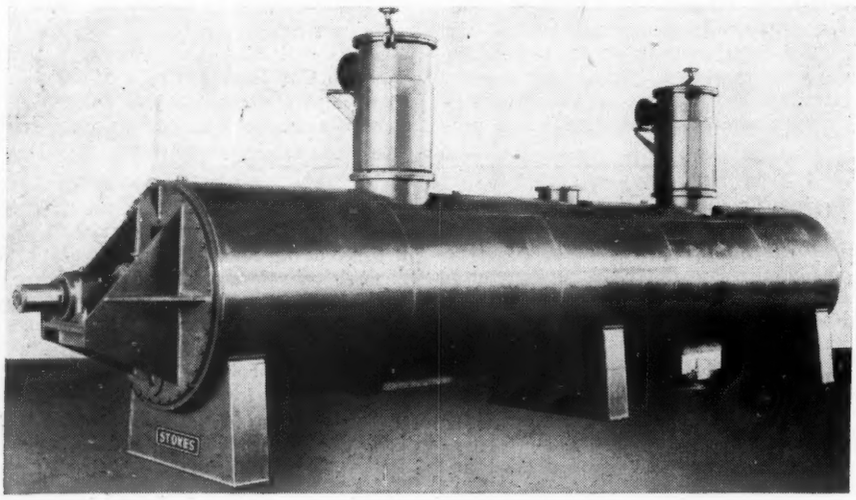
Unit is available in two sizes: 550,000 Btu. output, or 665 gph. at 100 deg. rise; and 730,000 Btu. output, or 875 gph. at 100 deg. rise. Generators are completely automatic. They are available in oil or gas fired models.

Four-pass construction of hot water generator shell insures high rating and high efficiency (more than 80 percent). All units are equipped with sturdy industrial type safety controls.

Hinged rear door lined with top quality refractory provides easy accessibility for cleaning and maintenance. Generator shell, including tubes, is completely galvanized, and outside of shell is covered with a thick insulation jacket.

Exhaust gases are carried away by means of a simple vent which can be easily attached to an existing chimney. Use of a forced draft burner eliminates need for a draft hood.

Large unit is 113 in. long and 44 in. high. Width is 26½ in., making it possible to pass through a standard door opening. Front end of base, including burner, can be easily removed for separate handling where required. All units are constructed to conform with ASME Code.



Improved Rotary Vacuum Driers 9

REDESIGN of many basic features of rotary vacuum driers, manufactured by F. J. Stokes Machine Co., Dept. I, Phila., is stated to materially increase operating efficiency of these units.

Driers are available in nine standard sizes, from 1 cu. ft. to 600 cu. ft. working capacity. Maximum mixing action of material, and essentially complete discharge when operating cycle is finished, is assured through redesigned spiral type agitators. Maximum contact of material with heating surface of shell is accomplished by new construction of agitator blades.

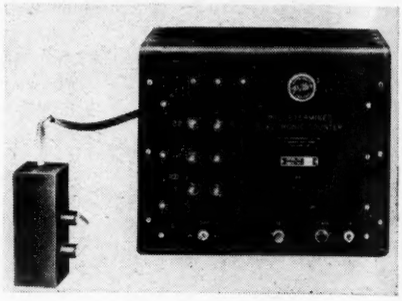
An exclusive feature, heating both shaft and agitator arms, improves performance and provides up to 30 percent more heating surface. This feature is now standard on company's models of 50 cu. ft. working capacity or larger. It can be furnished on smaller models.

Other peak efficiency features of redesigned driers include: Inverted refluxing type dust filters; rotary type vacuum seals, permitting operation in low millimeter range; and quick opening discharge doors of flush-plug construction.

Electronic Counter 10

DESIGNED specifically for use on folding box machines, new Model 700 Predetermined Photo-Electronic Counter is announced by Potter Instrument Co., Inc., Dept. I, Flushing, N. Y.

Instrument, which uses company's high-speed counting circuits, will predetermine count of either 25 or 50 at rates up to 9000 cartons per minute. Each time selected number of cartons passes detector,



counter energizes a kicker-type solenoid, thereby displacing 25th or 50th carton as required.

A sturdy, compact photoelectric detector is used for detecting count eliminating any contact with cartons. Housing is small so that it can readily be mounted on any existing folding box machine. Cartons which are closely spaced can be counted, since beam width of photoelectric detector is 1/16 in.

Voltage Controllers 11

A NEW line of low-voltage controllers for use with a.c. motors up to 800 hp. (at 550v.) and for d.c. motors up to 350 hp. (at 230v.) has been announced by General Electric's Control Division, Dept. I, Schenectady, N. Y. These new metal-enclosed controllers are designed for controlling squirrel-cage, wound-rotor, synchronous, or multi-speed a.c. or d.c. motors.

New controllers include in one unit conventional equipment required to start, stop, and control such motors, and in addition include a completely integrated draw-out air circuit breaker which provides adequate short-circuit protection (either 25,000 or 50,000 amp.).

Serving also as a circuit isolating device, this draw-out air circuit breaker is designed so that it is readily interchangeable. When one is removed for servicing another may be substituted immediately, thus preventing lengthy production delays. When breaker is pulled out to inspection and test position, it is mechanically latched and disconnected from all power. A mechanical interlock trips breaker when it is removed from its unit. Mechanical interlocks also prevent closure of breaker, unless it is either in the operating or the inspection and test position.

Enclosures housing controllers can be lined-up with other equipment.

Figuring on a Vacuum Installation?

Then here's a suggestion: There is an engineer in every Ingersoll-Rand branch office who is a specialist in the application of vacuum equipment. Why not give him a call? See what he has to say about your particular vacuum problem. He is convenient to you and is thoroughly qualified by years of experience to recommend vacuum equipment that will give you the most economical results dependent upon plant conditions. Chances are, the equipment best suited to your needs can be selected from the complete range of standard Ingersoll-Rand ejectors. Should it call for a specially engineered selection, then the full scale engineering and research facilities of Ingersoll-Rand will go to work on your problem.

FOR VACUUM EQUIPMENT
Specify I-R

- Steam-jet ejectors
- Reciprocating dry vacuum pumps
- Barometric condensers
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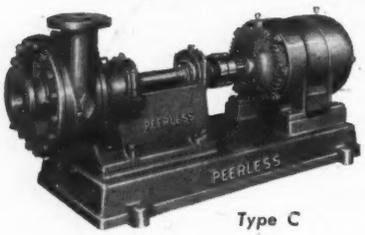
TYPE C

PEERLESS
Centrifugal
PUMPS
FOR PROCESS SERVICES



Type C

TYPE C ENCLOSED IMPELLER

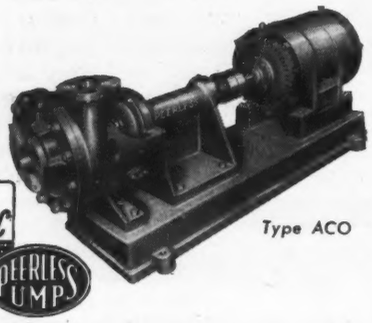
Designed to handle clear liquids which can be of corrosive nature. Single-stage, single-end suction design; range of capacities from 10 to 1200 g.p.m.; heads up to 231 feet; maximum working pressure of 150 lbs.

TYPE CO OPEN IMPELLER

Utilizes an open impeller to permit pumping of fluids up to 750° F with solids in suspension, brines, sludges, etc. Capacities from 10 to 1200 g.p.m.; heads to 231 feet; maximum working capacity of 150 lbs. All forms of drive. Both of the above pumps are described in Bulletin 810.

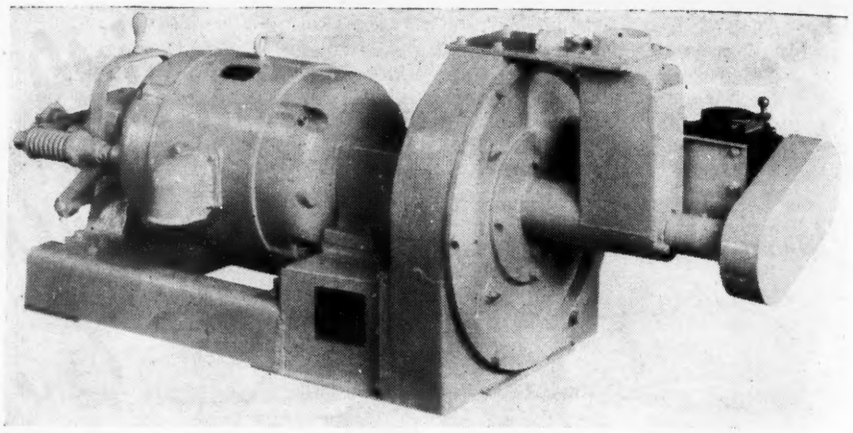
TYPE ACO FOR ACIDS AND CAUSTICS

Especially designed to pump caustics and acids. Handles fluids up to 800 g.p.m.; heads to 231 feet; maximum working pressure of 150 lbs. Temperatures should not exceed 300° F. Described in Bulletin D-2400.


Type ACO

fmc PEERLESS PUMP

PEERLESS PUMP DIVISION
FOOD MACHINERY & CHEMICAL CORPORATION
Factories: Indianapolis, Ind.; Los Angeles 31, Calif.
District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 North Broadway; Atlanta Office: Rutland Building, Decatur, Georgia; Dallas 1, Texas; Fresno, California; Los Angeles 31, California.



Continuous Nut Butter Production Mill 12

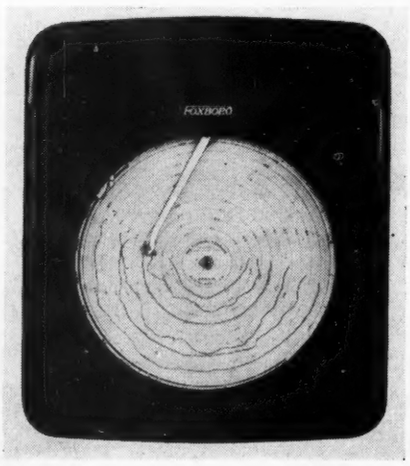
FOR continuous production of nut butter, a new mill is announced by Bauer Bros. Co., Dept. I, Springfield, Ohio. With a 30 hp. built-in motor, No. 248 mill has a capacity of approximately 2,000 lb. per hr. for finest grinding; and 3,000 lb. per hr. for medium grinding. Model 248-A employs a rotary type feeder; No. 248-C a screw feeder. Latter model, pictured here, can be equipped with a company metering unit for adding "Pix" (containing salt) to nuts entering grinding chamber.

Butter is completely finished as it emerges from mill. Removal of six bolts from hinged front case exposes complete grinding chamber for cleaning. Grinding plates can be set for any degree of butter smoothness by means of a micrometer dial adjustment.

Multi-Recorder 13

COMPLETELY electronic in principle, making from one to six different records on one circular chart, a high-speed instrument known as Multi-Record Dynalog Electronic Recorder is announced by Foxboro Co., Dept. I, Foxboro, Mass.

Records are composed of colored dots so closely spaced as to make virtually continuous lines. Recorder has only one



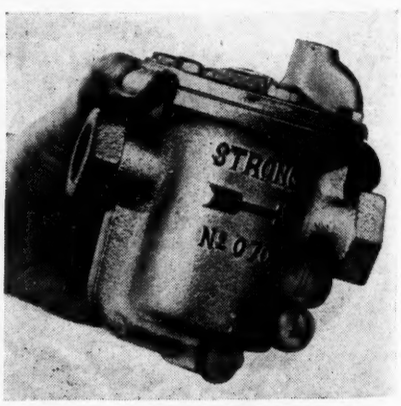
measuring system, either resistance bulb or e.m.f. type, but a positive-acting switching unit automatically brings the vari-colored pens into recording position at 6-sec. intervals, in any sequence desired. Sequence and number of points may be changed at will. Complete color-coding prevents possible mismating of circuits and pens.

An innovation in design of unit is use of its Rotacolor pen wheel holding the six recording pens, which are magnetically selected in turn and held in recording position by a single pen arm. Record may be used for measurement of temperature, pressure, humidity, liquid level, pH, conductivity, speed, and other process variables. A special "dry ink" insures clean recording. Instrument will operate continuously for several weeks without need of re-inking.

Steam Trap 14

DESIGNED particularly to meet needs for smaller capacity steam traps is a new model trap announced by Strong, Carlisle & Hammond Co., Dept. I, Cleveland, Ohio—No. 070. It fits standard applications wherever small drainage is a problem.

Available for pressures from 0 to 150 psi., new unit was especially built for small drainage jobs where condensate



loads are light and conditions call for economy of an inverted bucket trap.

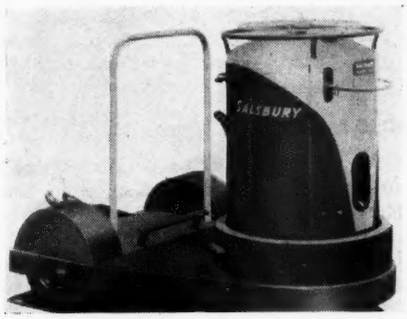
Special features include: Renewable seat—easily removed for servicing; seamless, deep drawn, stainless 18-8 bucket without welds; over-sized ports, increasing flow capacity; company's patented, Anum-Metl valve and seat.

Warehouse Tractor 15

LO-BED TRACTOR with a 36 in. turning radius is announced by Salsbury Corp., Dept. I, Los Angeles, Cal.

Features of this warehouse tractor include a low center of gravity, increased draw-bar pull, and a platform 10 in. from floor. It is adapted for either walking or riding. The 21-in. dia. finger tip control throttle ring, at waist height, makes possible "inching" along aisles for pickups, while speeds up to 8 mph. can be attained on long hauls with operator riding while towing a train.

Powered by Model AKS Wisconsin engine, tractor is equipped with a new



heavy duty automatic clutch and automatic transmission built for materials handling trucks. Complete turret power unit is mounted in chassis on a set of rubber-cushioned sealed roller bearings, which reduce vibration and facilitate rotation. Tractor weighs approximately 1,350 lb.

Density Determinator 16

FOR CONTINUOUS determination and indication of density of flowing liquids, Princo Densitrol is announced by Precision Thermometer and Instrument Co., Dept. I, Philadelphia. Operating on a hydrostatic method based upon change in weight of a totally submerged plummet having no support external to flowing liquid chamber, it is claimed to have sensitivity beyond that of existing methods of density indication.

Density sensitive, the totally submerged plummet, is fastened by chain to a fixed reference point. Plummet is so weighted that at middle of its indicating range it will support half the weight of chain, while reference point assembly supports half the weight of chain.

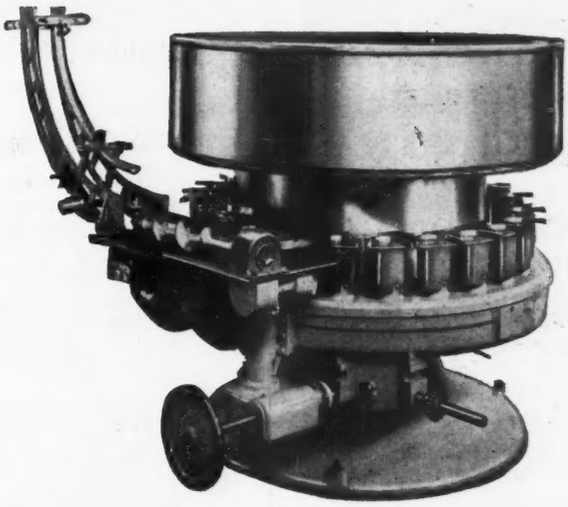
With a density rise from this mid-range point, buoyancy added to plummet by increase in density will raise plummet. As plummet rises, chain support is transferred from this fixed point to plummet, which will then come into equilibrium at that point where added weight of chain will equal its added buoyancy.

For each density within range of plummet-chain assembly, plummet will assume a definite equilibrium position. These changes of position are translated by an inductance pick up of three-winding differential transformer form into a scale or chart indication. Plummet action is entirely without friction, minimum clearance between parts being ¼ in. It is not affected by vibration.

Another First by CRCO

Higher Speed Filling

Equal to the Capacity of Today's Closing Machines



New 24-Valve Liquid Filler

For Tomato, Citrus and All Fruit and Vegetable Juices, Thin Soups, Tomato Puree, Oils, Jellies and All Free-Flowing Liquids

A startling development by CRCO Engineers, employing the principles of the world-famous Ayars Fillers. Handles a full range of tin or glass containers from 202x204 to 404x700—with a positive accuracy of fill, even at top speed.

An entirely new stream-lined 24-Valve Liquid Filler with fewer parts and enclosed mechanism—a new, larger bowl designed to minimize foaming—fully automatic air control that maintains liquid level in the bowl within less than ¼" variation—an individual control on each valve to accurately regulate head space—an hydraulic mechanism to raise or lower the bowl—valves that can be cleaned without removal from the bowl—a built-in discharge table arranged for convenient hookup to any closing machine—plus a variable speed control that will SLOW up the Filler to the capacity of the closing machine.

Write for complete details, or see it at the Canners' Convention, Jan. 14 to 19, at Atlantic City.

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Niagara Falls, New York

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Chisholm-Ryder Company of Pennsylvania
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Give Your Products This Combination of Merchandising Power!

PROTECTION OF PRODUCT
against moisture vapor transmission. Guard flavor, freshness and food value.

PERSUADING EYE-APPEAL
through skillful design, intelligent use of color and packaging materials.

CONSISTENT QUALITY
of packages speaks well for your product; permits high speed automatic packaging.

STRONG BRAND IDENTITY
established by coordination of design and printing. Promotes your name.

COMPETITIVE PRICES
of Oneida's bag packages make for lower packaging costs. Unit package costs lowered.

This highly desirable combination of packaging virtues is now being provided for baked goods, meats and sausage, grain and cereal products, nuts, potato chips, dehydrated and frozen foods, candy and many others.

Oneida's complete line includes bags, envelopes, printed wraps and continuous rolls of cellophane, glassine, waxed glassine, laminates, dry wax, parchment, M.G., White Wove and other papers.

Samples mailed on request.

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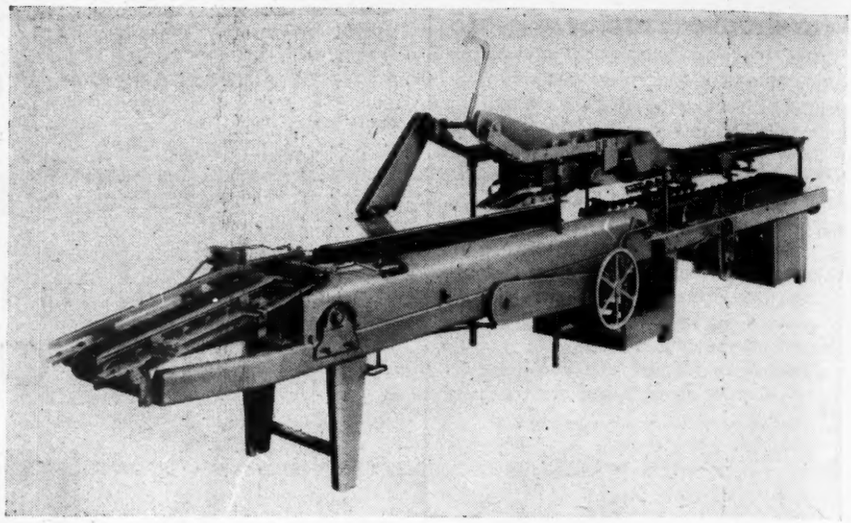


Improved Automatic Case Sealer 17

IMPROVEMENTS in company's single-action, end-sealing, automatic case sealer are announced by Elliott Manufacturing Co., Dept. I, Fresno, Cal. With all metal housing and lower elevation, new streamlined, compact unit permits more positive sealing without sacrificing speed.

Single adjustment sets all overhead steps in the unit's mechanism which applies compression and moves sealed cases to end of drying line simultaneously. Overhead adjustment of this section by gears has been eliminated in favor of a new, handier low-belt design.

Sink Line Cleaner 18

WITH IMPROVEMENTS stated to make it more efficient and easier to use, a new Spartan Model 600 Electro-Rod has been announced by Spartan Tool Co., Dept. I, Chicago. It embodies: A more powerful reversible motor with new gear train mounted on hardened and ground shafts rolling in needle bearings; new ball-thrust bearings; 3-conductor cord providing ground wire; and new off-on switch for greater safety from shock.

Patented Rota-Tilt cable container affords push-button controlled tilting. A finger touch tilts container at any desired angle to cleanout and has a capacity of 100 ft. of ½ in. sewer cable. Latter is especially coiled and reinforced with inner cable to withstand added torque of motor driven machines.

Motor unit is easily detachable, and when removed it is an excellent slow-speed drill when used with carbide tips for making clean sharp holes in tile, slate and mortar.

Voltage Stabilizer 19

CUSTOM engineered specifically for building into electronic equipment where space and weight limitations are critical, a new voltage stabilizer model is being offered by Raytheon Manufacturing Co., Dept I, Waltham, Mass. Unit is a miniature 5v. custom-built stabilizer for operation at an input voltage of 95 to 130v. a.c. 60 cycles, single-phase, with an output of 120v. stabilized to ± ½ percent.

Vibrometer 20

A NEW recording vibrometer which measures and records frequency, displacement, and wave shape of mechanical vibration, has been announced by General Electric's Special Products Division, Dept. I, Schenectady, N. Y.

Built to operate either when mounted on a fixed base or held in the hands, unit weighs only 7 lb. and is less than 8 in. in length. It was developed for application in testing all types of reciprocating and rotating machinery within a vibration frequency range of 10 to 120 cycles per second. It records both steady-state and transient vibrations.

A prod extending from one side of vibrometer is set in motion when held against a vibrating body. This motion is amplified by a cross-spring arrangement and transmitted to a stylus which inklessly records vibration on wax paper, thus making available a permanent record for vibration analysis of equipment. Another stylus produces a timing mark near edge of wax paper every ⅓ sec. Both chart speed and interval between timing marks are governed by a synchronous motor operated from a 115-v. 60-cycle power supply. Two push buttons are provided to give chart speeds of 1 in. per sec. and 3 in. per sec.

Motion of stylus on chart can be ob-

served through a window in top of all-aluminum case. One side of case can easily be removed for rapid placement of new 50-ft. wax paper roll when old roll is depleted.

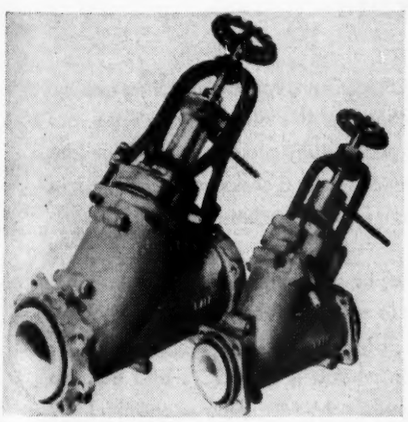
Registration Control 20

FOR MAINTAINING accuracy in high-speed printing and cutting operations on paper, cellophane, steel, tin, aluminum, or other sheet material, photoelectric registration control type 23LF3 is announced by Photo-switch, Inc., Dept. I, Cambridge, Mass. It is recommended for all types of automatic packaging, printing, labeling and cut-off machinery. A typical application of control is in connection with cutting operation of wrapping machines. Photoswitch continuously watches trademark printed on each wrapper, holding it in its proper location with reference to wrapper edge which is being cut off. Unit operates from both opaque and transparent web materials and controls from either light or dark registration marks. It may be used to control practically any type of correcting means on both continuous and intermittent feed machines. Specifications: Supply—115 v, 60 cycles; output—single pole, double-throw relay 1000 va.; speed of response—in excess of 1/1000 sec.; ambient temperature—32 deg. F. to 120 deg. F.

Porcelain Valves 21

RECOMMENDED for use in corrosive or contaminating applications, a new line of armored porcelain valves is announced by Lapp Insulator Co.'s Process Equipment Div., Dept. I, LeRoy, N. Y. Innovation is addition of high-strength, heat-treated silicon aluminum armor.

Body, plug, retaining rings—all parts with which chemicals can come in contact—are of solid, non-porous porcelain, a material of high corrosion resistance. Addition of armor provides protection



for personnel and equipment against porcelain breakage from carelessness or accident.

Armored Y valves are available in 1, 1½, 2, 3, 4 and 6 in. sizes; angle valves in 1 and 2 in. sizes; and flush valves in 1½, 2 and 3 in. sizes for 3, 4 and 5 in. tank outlets, respectively. Standard 125-lb. flanges are integral with armor; porcelain faces are machine ground smooth and flat for gasketing.

MATERIAL HANDLING *News*

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a BIGGER exhibit of BETTER machines TO DO MORE WORK AT LOWER COST

—the Third National Materials Handling Exposition

The 1949 Exposition will be held in Philadelphia January 10 through 14 and will constitute a broad view and preview of "industrial history in the making." It will be the most convincing demonstration of all time that the Science of Materials Handling is eternally new—that it is a never-ending process of evolving new and better methods and equipment to the end that our National economy can shake off the shackles of old, inefficient and time-consuming practices which have become prohibitively costly both in human energy and in dollars.

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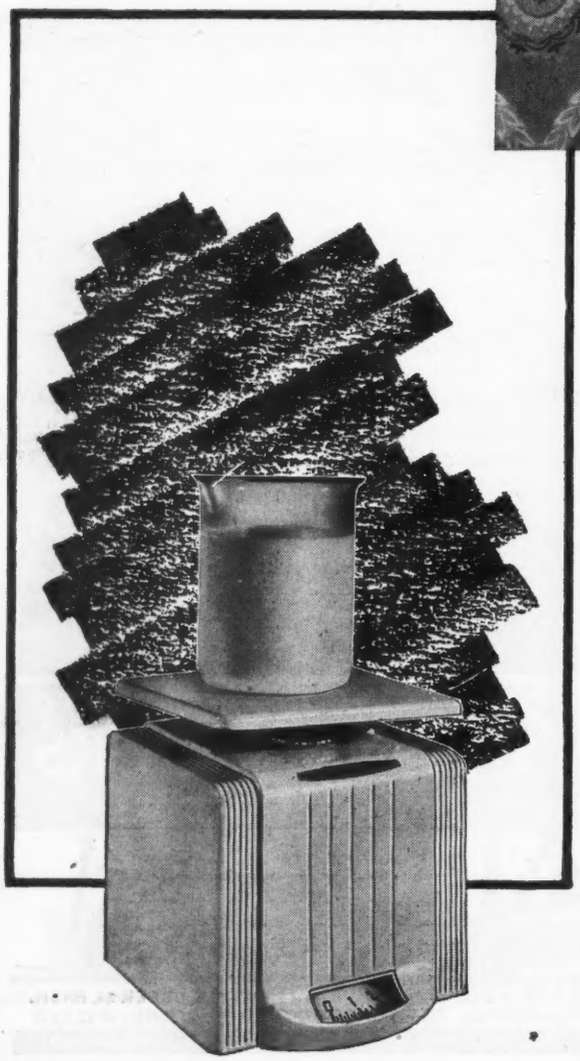

A Georgian Silver Service or a Pound of a UPACO Resin Emulsion Adhesive

Both the words Georgian and UPACO are symbols of highest quality. At first glance, the gleaming richness of this silver service wins your favor with yuletide visions of a gay holiday group gathered for late evening coffee. But the silver service serves a comparative few, while a single pound of a UPACO Resin Emulsion Adhesive supplies steaming coffee to hundreds.

UPACO offers manufacturers of liquid-tight containers for both hot and cold liquids three of its famous resin emulsion adhesives. All offer maximum production benefits. M-386, the finest of the three, gives the utmost protection against liquids. M-360 is UPACO's best balance between quality and economy, while M-449 is the economical buy for those operations where its liquid resistance is satisfactory.

We shall be pleased to supply samples or accept your orders for trial quantities of ten or thirty gallons at the drum price.

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CATALOGS, BULLETINS

This digest of manufacturer's new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Salt-Resistant Metals 51

"Salt . . . As a Corrosion Problem", 24-page profusely illustrated booklet, gives important industrial uses of salt and describes resistant equipment for handling it. Booklet has data for salt producers and users. Corrosion rates for various metals are presented in tabular form.—The International Nickel Co., Inc.

Meat Packers Guide 52

New developments in equipment for the meat packing industry are pictured and described in 20-page Book No. 2268. Conveyors, inspection tables, screens and grease collectors are among equipment covered.—Link-Belt Co.

Vibration Control 53

Advantages and limitations of spring mountings, rubber mountings and cork materials in control of vibration are given with selector chart for more than 50 applications in Bulletin G-101.—Korfund Co., Inc.

Stainless Meat Cutter 54

S. S. power meat cutter, Model 22, is pictured and described in 17x22 broadside. Dimensions are given on single sheet punched for insertion in notebook.—The Biro Mfg. Co.

Induction Motors 55

"Heavy-Duty" squirrel-cage induction motors are described, with cutaway and sectional drawings showing details of construction, design and insulation, in Bulletin 1300-PRD-190 for 2-pole and 1300-PRD-189 for 4 or more pole motors.—Electric Machinery Mfg. Co.

Bakery Equipment 56

Precision-built bakery machinery and ovens are pictured and described in 8-page "Buyers' Guide." Specifications and capacities are given for bread wrappers and dough mixers. Capacities are given for various types of Thermo-Radiant ovens and the new Ultramic oven.—Bakery Div., American Machine & Foundry Co.

Ultraviolet Protection 57

Use of ultraviolet for protecting soft drinks, wines, beers, milk, meat products and many other foods is recommended in 6-page accordion folder. Steril-Hood is supplied in chain-suspended and bracket-supported models. Ultraviolet water sterilizer tank also is described.—Elenite Products, Inc.

Smoke Unit 58

For smoking hams, bacon, bologna, or other meat products, a clean-smoke unit is offered in 4-page folder. For use with either gas or steam heat, it is reported to supply a uniformly clean smoke for all types of houses.—Martin H. Lipton Co. Inc.

Truck Refrigeration 59

Four models of refrigerating equipment, gasoline engine powered or electric, are pictured and described in single-sheet bulletin.—U. S. Thermo Control Co.

Dial Scales 60

Prepared for the dairy industry, Bulletin P-916 covers self-contained weigh-can, overhead weigh-can, dairy and butter-tub scales. Installations are shown in photographs, and methods of dial graduation are given. Series of six detailed drawings show most-used suspension and weigh-can arrangements. Other bulletins, P-714-D, F, C, and G, are concerned with bench scales, portable platform scales, dormant platform scales and counting scales.—Yale & Towne Mfg. Co.

Packing Vegetables 61

Equipment for trimming, washing, packing, icing and labeling fresh vegetables in synchronized packing systems is described pictorially and in text by 12-page booklet, "New Horizons

for More Profitable Vegetable Packing." Field baskets, conveyors, tables, electric counters and all necessary related equipment also are covered.—The Conveyor Co., Inc.

Tailor-Made Wrapping 62

Directed to the processor who has a difficult package to wrap, 4-page bulletin considers samples of machines which have been designed for specific needs, such as packaging of tomatoes, fish fillets, and candies.—Package Machinery Co.

Stainless Tanks 63

For processing, mixing, holding or blending beverages, milk or other liquid food products, Bulletin SS-48 presents Stainless San-I-Tanks, Specifications, pictures and diagrams are given for four models.—Metal Glass Products Co.

Interchangeable Valves 64

Regular type "Renewo" valves, which can be simply converted to nickel alloy or stainless plug type valves by changing seats and disks, are described with cutaway views and dimensions in single-page Folder No. 577.—The Lunkenheimer Co.

Water Softener 65

Operation of sodium zeolite water softener is explained in Bulletin 28B7107, which details construction features of the softener and salt tanks, control valves, backwash and rinse controls, piping and accessories. Diagrammatic arrangement of dual sodium zeolite system is portrayed.—Allis-Chalmers Mfg. Co.

Gas Analyzers 66

Combustion control by use of gas analysis is presented in 8-page Bulletin No. 213, describing units for analysis of carbon monoxide and dioxide, methane, oxygen, hydrogen and nitrogen.—Burrell Technical Supply Co.

Variable Speed Drive 67

Single power unit, the Speed-Trol, is presented in improved model in 4-page, 3-color bulletin. Flexible speed control is feature.—Sterling Electric Motors.

Carton Closers 68

Stitching of sides and ends of telescope and folding cartons and sealing of filled bags with Silver Stitcher are pictured and described in 12-page Catalog AD-15. Specifications of equipment are given.—Acme Steel Co., Stitching Wire Div.

Continuous Processing 69

For continuous closed processing of liquids and viscous materials, various models of Votator are recommended by 4-page illustrated bulletin.—The Girdler Corp., Votator Div.

Strapping System 70

Equipment for metal strapping of cartons, crates, boxes and bales, also for heavy duty strapping of carloads, truckloads, pallets and skidded shipments, is pictured in 16-page bulletin. Strapping is illustrated, and dimensions, weights and uses are given in tabular form.—Brainard Steel Co.

Continuous Mixer 71

Features and specifications of the Oakes continuous automatic mixer are presented in single-page bulletin. Unit's capacity ranges as high as 6,000 lb. of product per hour. Diagram shown operating features.—American Machine & Foundry Co.

Speed Reducers 72

Single- and double-reduction speed reducers, Series 2400, 4600, and 4700, are described in tables, text and dimension drawings in 8-page bulletin.—Sesco Engr. & Supply Corp.

Flour Sifter 73

Sectional view of flour-milling sifter is feature of 4-page bulletin. Aluminum sieve box is pictured, and specifications are given.—The Wolf Co.

Electric Fork Truck 74

Skylift, a new electric fork truck, is standard 83 in. in height when collapsed and will lift to 130 in. It is described in 6-page accordion bulletin, which reports that rider-operated trucks are available in 2,000, 3,000, and 4,000 lb. capacity models.—Automatic Transportation Co.

Flexible Belt Conveyor 75

Escalator-type, interfloor power belt conveyor —Floor-Veyor, Jr.—is pictured and described

HOW TO GET THIS LITERATURE

Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

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Standard GRAVITY & POWER CONVEYORS

in single-sheet bulletin. Horizontal and inclined models are detailed.—Rapids-Standard Co., Inc.

Materials Handling Equipment 76

Elevating, conveying, drying, cooling, and screening machinery and equipment, also units for loading, unloading and dumping, are covered in profusely illustrated 8-page Folder No. 2276. —Link-Belt Co.

Motor and Pump Bulletins 77

Construction details and characteristics for induction motors, standard open type and totally enclosed fan-cooled motors, are given in 28-page illustrated Bulletin 05B-6107A. Also included is a motor selection chart, containing rpm.-versus-hp. data for many types of motors. For use in flour and feed mills and other hazardous locations, explosion-proof motors are offered in sizes from 1 to 250 hp. in 4-page Bulletin 51B6145A. UL labels are carried for Class 1, Group D and Class II, Groups G and F locations. Foot mounted, submerged and side-wall mounted coolant circulating pumps are covered in 8-page Bulletin 52B6975. Dimensions, diagrams and capacity tables are included. Bulletin is punched for insertion in notebook.—Allis-Chalmers.

Plant Supplies

Aluminum Data Book 78

Information on alloys, tempers, sizes, shapes and properties of aluminum and mill products is contained in comprehensive 162-page data book. Itemized indexes for both tables and text are included.—Technical Editorial Service, Reynolds Metal Co.

Wet-Surface Paint 79

Recommended for use in packing houses, breweries, bottling plants, dairies and all food processing plants, Damp-Tex Enamel is one of paint products described in 40-page Catalog 46. Special factory pre-treatment is available to make enamel resistant to mold, mildew, bacteria and fungi. Enamel is offered in eleven colors. Prices are given.—Steelcote Mfg. Co.

Industrial Chemicals 80

Listing of chemicals from acetone to zirconium is given in 14-page folder, for use in industrial processing.—Faesy & Besthoff, Inc.

Steel Tubing 81

Seamless and welded carbon steel tubing, stainless tubing and pipe, and structural tubing and boiler tubes are discussed in 32-page bulletin. Information on machining, heat treating and fabricating, reference data on tolerances, mechanical properties and analyses also are given.—Joseph T. Ryerson & Son, Inc.

Plasticizer 82

Vistanex (chemically, polyisobutylene) has a wide variety of uses, as cited by new 45-page notebook. Applications such as for moisture-proofing of paper for packaging frozen goods, bakery products, etc., and as tank lining for resistance to alkalis and acids are accented. It is also used in chewing gum as a partial replacement for chicle. Many graphs and tables give properties of this material.—Enjay Co., Inc.

Insulating Materials 83

Descriptions, basic forms and uses and pictures of various types of insulating material and products for use in air-conditioning equipment are given in 8-page booklet.—Owens-Corning Fiberglas Corp.

Emulsifier and Homogenizer 84

For complete emulsification and distribution of fats in the production of bread or cake products, Aldo 33 is offered by 8-page bulletin. Purpose, function, method of use and proportions and formulas are given.—Glyco Products Co., Inc.

Care of Floors 85

Step-by-step guide for care of flooring is offered in 20-page illustrated booklet. Rubber, asphalt tile, wood, cork, linoleum, concrete and terrazzo are considered and practical suggestions

Depend on AUTO-LITE

For Temperature Indication

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- **MODEL F1** For all applications requiring accurate temperature indication. One-to-one liquid filled movement. Shown with capillary tubing for remote reading. From $22.
- **MODEL G** Same reliable movement as F1. Evenly spaced, legible scale. Choice of dial ranges. Front or back flange case. Shown with center back connected rigid stem for direct mounting. Dial dia. 3½". From $18.
- **MODEL V** For installations where the vapor tension type thermometer is suitable. Bottom connected stem. Dial dia. 2½", 3½" or 4½". From $10.25.

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for cutting maintenance costs are offered.—S. C. Johnson & Son, Inc.

Concrete Flooring 86

Advantages of concrete floors with natural emery are listed for eight types of installations in 4-page Bulletin K-801.—Walter Maguire Co., Inc.

Control Equipment

Condensed Catalog of Controls..... 87

Recorders, controllers and indicators of the standard line are concisely described in 4-page Bulletin Z6500. Separate price list accompanies bulletin.—Wheelco Instruments Co.

Instrumentation System 88

Engineering and application data covering new "Alcotran" instrument system are featured in 8-page Catalog R-10. Measurement readings are reported accurate within 0.25 percent.—Automatic Temperature Control Co.

Temperature Measurement 89

Recording and indicating thermometers of liquid-filled-bulb type are covered in 4-page bulletin. A vapor-pressure-actuated indicating thermometer also is described, as are bulbs for all types.—The Electric Auto-Lite Co., Instrument & Gauge Div.

Smokehouse Controlling 90

Salimeters, thermometers and controllers for curing and smoking of meat products comprise presentation in 16-page bulletin. Also, reverse acting diaphragm valves for brine, water or steam are covered and specifications are given.—The Griffith Laboratories.

Humidity Recorder 91

Designed for recording minute fluctuations in relative humidity, the Microhygrograph, is described in 8-page Bulletin No. 800. Humidity measurement is by sensitive diaphragm.—Garden City Instruments, Inc.

Deaeration Control System 92

No. 6 in Instrumentation Data No. 3.2-4 series for food processors covers a control system for expelling dissolved or occluded oxygen from bottled and canned foods. Installation diagram is given.—Brown Instrument Co.

Rotameters and Flow Indicators..... 93

To aid in selection of meters best suited for individual applications, Bulletin 18-RA pictures and briefly describes various types of rotameters and flow indicators.—Schutte and Koerting Co.

Miscellaneous

Consultant Service 94

"Successful Products" is title of 4-page folder which offers assistance in new product planning and development. Examples of previous projects are given, such as development and introduction of Sealcone, product used in packaging beverages.—Charles H. Welling & Co., Inc.

Water Treatment 95

The subject of industrial water treatment, from basic theory to specific problems, is covered in new booklet with photographs, charts and text. Eight-point treatment system is detailed. Also noted is use of cooling systems and air conditioning.—Bird-Archer Co.

Laboratories Service 96

"Buying the Unknown with Confidence," 14-page booklet, includes discussion and pictures of research projects in dehydration and distillation.—National Research Corp.

Laboratory Equipment 97

Twelve-page booklet, "What's New for the Laboratory", is No. 5 in a series. Covered is various laboratory equipment.—Scientific Glass Apparatus Co., Inc.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

STORAGE

Poultry Storage

EARLIER studies on frozen storage of poultry suggested that 0 deg. F. was the upper temperature limit for safe commercial storage. The data, however, were not wholly consistent on this point, so further studies were initiated in hope of clarifying the matter. Using roasting chickens, 20 birds were stored for 6 months, 10 at −10 deg. F. and 10 at +10 deg. F.; and 40 birds were stored for 9 months, half of them at each of the two temperatures indicated. After the birds were slaughtered and dressed they were aged at +35 deg. F. for 24 hr., separately in cellophane and frozen at −30 deg. F. for 24 hr. They were then stored as indicated above.

Roasters stored at −10 deg. F. were in much better condition than those held at +10 deg., the latter showing darkening and dessication. Palatability tests indicated appreciable deterioration in flavor and juiciness, with significant difference in scores on birds stored at low and high temperatures, favoring the former. With thigh muscle the difference in flavor between birds stored 6 and 9 months was highly significant, the latter scoring lower than the former.

The tests emphasize the importance of temperature and time in successful frozen storage of poultry. They show that +10 deg. F. is not a satisfactory temperature for storage of 6 months or more. On the other hand, temperatures of −10 deg. F. and below preserve quality very well for 9 months.

Digest from "Poultry Storage at Subfreezing Temperatures," by R. Wills, B. Lowe, and Geo. F. Stewart, *Refrigerating Engineering*, 56, 237-8, September, 1948.

Preserving Eggs

NUMEROUS means have been suggested for coating the shells of fresh eggs to prevent escape of moisture and CO_2 thereby avoiding the internal changes that contribute to staleness. Wartime investigators reached the conclusion that none of the sealing agents was satisfactory when used alone. A more recent study has compared the effectiveness of various sealing substances, based on: (1) Change of weight of eggs during storage, and (2) change of pH in the albumen, which gives some indication of the escape of carbon dioxide. Thirty chemical agents were tested to determine their effect on the relative impermeability of egg shells and on pH of albumen. Mineral oils ranked high in the list, but their sealing effect was increased substantially by the addition of organic acids. Best results were obtained with an emulsion of mineral oil, one percent stearic acid, and from 0.5-2.0 percent lactic acid. This emulsion coating had the very high relative impermeability to water vapor of 99 percent. Some eggs thus treated showed no loss in weight during a 20-day storage, and the pH of albumen was no different from that of fresh eggs. The results suggest that eggs thus treated may not require low-temperature and high-humidity storage in order to preserve their fresh quality.

Digest from "Preservation of Intact Eggs by Sealing With Chemical Agents," by ... Romanoff and W. D. Yushok, *Food Research*, 13, 331-35, July-August, 1948.

BREWING

Beer Clarification

BEER, clarified by centrifuging, will warm up 0.9—5.4 deg. F, due to friction of the whirling bowl with the surrounding air. This rise would not be serious, except that centrifuged beers are more inclined to develop chill haze than filtered beers. It is believed that the highest temperatures occur on the inner circumference of the bowl, causing particles of trub to dissolve in the beer flowing past them. By chilling the beer nearly to freezing and conducting the centrifuging in a cold room, some of these difficulties may be avoided.

The temperature rise due to friction between the bowl and the surrounding air may be calculated from the power input of the centrifuge. Thus, a machine using 4.8 kw. will have a heat output of 4,128 kilocalories per hour. About 3,800 kilocals. will find its way into the beer, the remainder being radiated from the metal parts of the machine.

If the centrifuge is to be used for coarse clarification, and is followed by a pulp filter, with a throughput of 6,000 l. (about 48 bbl.) per hr., the rise would be about 1 deg. F. If the entire clarification of the beer were carried out in the centrifuge at a rate of 1,000 l. (about 8 bbl.) per hr. the rise would be about 6.8 deg. F. At the bowl wall, the temperature of the beer in contact with the trub layer may be 10—16 deg. higher than the temperature of the beer flowing into the centrifuge.

By surrounding the rotating bowl with an air space through which air can enter near the spindle and escape at the periphery, much of the heat can be dissipated to the air current, and the heating effect on the beer reduced by two-thirds.

Digest from, "The Question of the Temperature Rise of Beer on Clarifying in a Centrifuge," by Earl Fehrmann, *Brauwissenschaft* (Supplement to *Die Brauwelt*), 21-23, August, 1948.

Phytin in Barley

BARLEY contains on the average 1 percent of phosphorous as P_2O_5, most of it bound to inositol in the form of phytin (the name given to inositolhexaphosphoric acid and its salts). During malting the enzyme phytase splits phytin into *i*-inositol and inorganic phosphates. Necessary for fermentation and growth of yeast, both of these are found in yeast in considerable amounts.

In five varieties of Swedish barley examined over two harvest seasons, the phytin content varied from 1.05-1.17 percent, dry basis, with only minor varietal and seasonal differences. Two of the varieties showed up to 50 percent variations in phytin content, ac-

Index to Abstracts

STORAGE
Poultry Storage 191
Preserving Eggs 191

BREWING
Beer Clarification 191
Phytin in Barley 191

STARCH
Copper in Starch Sirups 192
Starch Sirups 192

BEVERAGES
Kefir—Fungus Beverage 194
Herb and Spice Wine 194

ENGINEERING
Spray Cooling System 196

DEHYDRATION
Process for Drying Rice 198

MISCELLANEOUS
Soybean Whip 200
Flies Resistant to DDT 200
Air Purification 202

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cording to geographical location of their growth.

During malting, about 25 percent of the phytin content is split in seven days of growth. Drying the malt causes little additional change. During malting, 50-63 percent of the phytin is split into inositol and phosphates at pH 5.9. To obtain complete splitting, the pH must be lowered to 5.0 or less. At the higher pH values, the inositol is in a form incompletely available for utilization by the yeast, but at pH 5.0-5.3 it becomes completely available.

In barley, the phytin is water soluble, but during steeping prior to malting it is partly transformed into an insoluble form. This seems to be due to phytin acting as a cation exchanger forming insoluble Ca and Mg phytates.

Digest from "Barley Phytin in Malting and Brewing," by E. Sandegren, *Journal of the Institute of Brewing*, 200-07, July-August 1948.

STARCH

Copper in Starch Sirups

STARCH sirups, it is pointed out, corrode copper equipment to a lesser degree than does water at the same pH. Corrosion can be reduced during processing by mixing the converting acid with the starch slurry rather than with the priming water. Copper in the hydrolysate is partly removed at neutralization and the subsequent filtration.

At pH 5.0, 50 and 85 percent is removed in potato and wheat sirups, respectively. More is removed if the pH is higher at filtration. Bone char removes over 99 percent of the copper present, but activated carbon removes less than 20 percent. For this reason bone char is the preferred decolorizer for starch sirups made in copper equipment.

Digest from "Copper Corrosion and its Control in Starch Syrup Manufacture," by K. A. Clendenning, *Canadian Journal of Research*, 277-83, Vol. 26F, July 1948.

Starch Sirups

SIRUPS of almost identical taste and appearance have been made in the pilot plant from wheat, corn, waxy corn, potato and tapioca starches. All except potato starch (which was slower) hydrolyzed at about the same rate with 0.2 percent HCl, using slurries of 22-24 deg. Bé. Protein contamination does not affect hydrolysis but does lead to foaming, turbidity and bitterness in the finished sirup.

Insoluble solids, removed after neutralization of the hydrolysate, averaged 1.6 percent for cereal starches and 0.3 percent for potato starch. Neutralization to pH 5.0 proved the most satisfactory for good filtration rate and filtrate clarity. This pH seems near to

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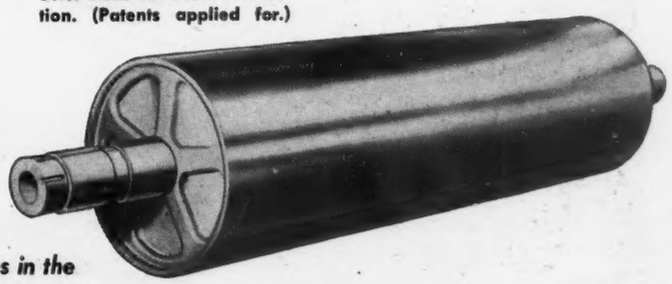

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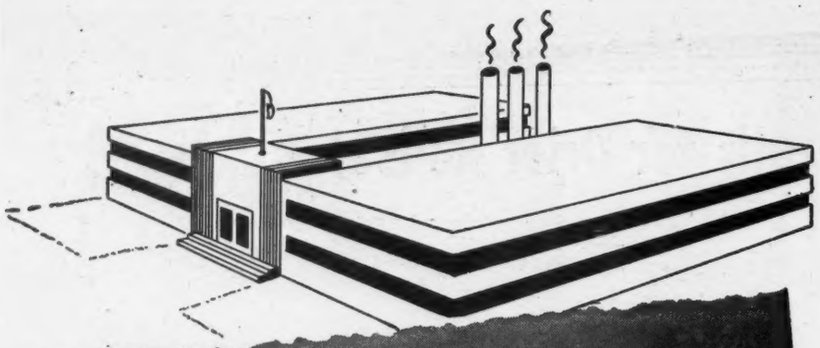

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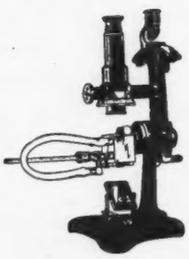

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the isoelectric point of the proteins removed.

Based on juice weight, 0.5 percent activated carbon decolorized either 14 or 30 deg. Bé sirups. There was a decided decrease in color development and improved removal of color when distilled, instead of tap, water was used in the processing of the starches.

Protein, solids, and light in tap water encourage development of color and fluorescence, though their development can be inhibited by use of sodium bisulphite. Prime quality starches, converted in distilled water slurries, and decolorized with bone char or acid extracted carbon, yielded sirups that remained colorless almost indefinitely.

Digest from "Production of Syrups from Wheat, Potato, Tapioca, and Waxy Cereal Starches," by K. A. Clendenning and D. E. Wright, *Canadian Journal of Research*, 284-96, Vol. 26F, July 1948.

BEVERAGES

Kefir-Fungus Beverage

SOME German breweries have undertaken kefir fermentations for the preparation of new milk beverages flavored with herbs. A brew of various herb flavorings and milk are the chief raw materials. The herb-flavored milk brew is fermented with kefir grains, a lactose-fermenting yeast-bacteria symbiotic mixture. The kefir-fungus increases in a manner somewhat analagous to the growth of yeast in the fermentation of beer. After separation, washing and drying on rolls, the kefir contains about 40 percent protein, 4 percent fat and 9 percent ash. Its protein has an exceptionally high biological value. Taking casein as 100, kefir powder has a value of 90, and brewers yeast protein about 84. It is the best microbial protein yet found, a circumstance that may be connected with its growth on a casein-containing medium. Both casein and kefir powder are rich in cystine. Microbial proteins from organisms growing fermentatively, such as kefir, beer, or wine yeasts, have higher biological values, than those from organisms grown with forced aeration, such as wood-sugar yeast or bakers' yeast.

Digest from "The Biological Value of Proteins From Kefir-Fungus in Comparison to the Protein of Milk, Different Yeasts and Molds, as Well as to Potato Protein," by Hermann Fink, *Brauwissenschaft* (Supplement to *Die Brauwelt*), 11-16, July, 1948.

Herb and Spice Wine

LACK of raw materials for manufacturing adequate supplies of beer and other carbonated beverages normally consumed in Germany, has stimulated development of acceptable substitutes.

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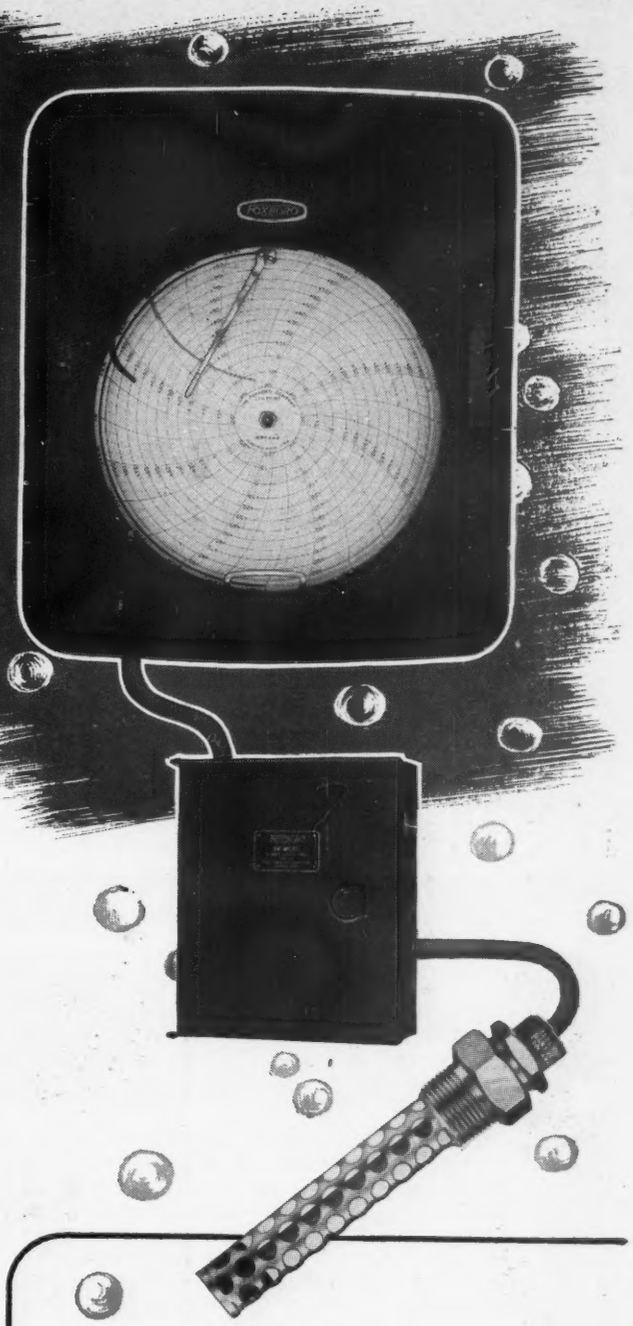

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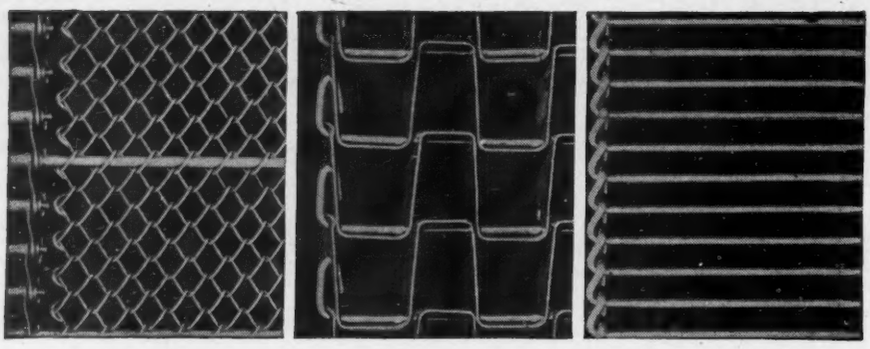

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One of these, brought out by the Bavarian Milk Supply G.m.b.H. of Nuremberg, is an effervescent herb and spice "wine" in which milk is used to clarify the herb tea and to furnish part of the fermentable sugar for alcohol and CO_2 production.

Known as "Milone", the beverage is prepared by first souring skim milk to one percent lactic acid, and then mixing it with an equal volume of a three percent "tea" of herbs, the names of which are not stated. The tannins of the herbs are precipitated along with some of the milk proteins, the clarified liquid is fermented with a lactose-fermenting yeast, and finally sweetened with sugar or artificial sweeteners. The final product is a clear sweet-sour fermented drink having about 0.8 percent alcohol and a flavor described as "sweet, herb-spicy and fruit-juice-like."

The beverage keeps for several months in cold storage cellar tanks; 3-12 months in bottles at 44-50 deg. F. "Milone" is subject to off-flavors from poor fermentation technics—such as yeasty flavor from deteriorated yeast, bacterial infections, and cloudiness from bad filtration, or warm cellars. The pre-souring of the milk and the use of the herb infusions must also be carefully controlled to avoid too sour or woody and astringent tastes.

The process has been patented in Germany in patents, B207200IVa/53i, Sept. 25, 1944, and B2076541Va/53e, Dec. 8, 1944.

Digest from "Fermented Beverages from Plant Extracts and Milk," by M. E. Schulz and K. Fackelmeier, *Brauwissenschaft* (Supplement to *Die Brauwelt*), 43-45, September, 1948.

ENGINEERING

Spray Cooling System

INDUSTRIAL plants with limited supplies of water for cooling purposes are dependent on spray ponds in which cooling is effected by evaporation. Hot water is ejected from sprays and allowed to fall naturally into a pond below. The shortcomings of this system are: (a) Only the sprays in the outside row on the windward side are in contact with air of the lowest humidity; and (b) loss of water by windage is appreciable and may amount to 15-20 percent. These deficiencies have been largely overcome in a new design for spray cooling at an Australian sugar mill.

The entire spray system is mounted on piers about 3 ft. above the ground. Each spray is placed 1 ft. above a 6 ft. "pagoda" or louvred pyramid, through the louvres of which cooling air may pass freely upwards. Thus each spray

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(liquid or paste form)

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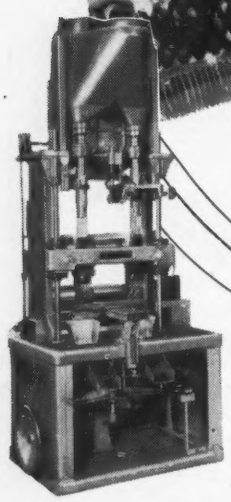

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has its own supply of air, unaffected as to temperature or moisture content by any of the adjacent sprays. A suitable enclosure is erected around the entire spray system to eliminate loss by windage, and to assist in the upward movement of the air after it has absorbed heat from the water. Each spray operates at maximum efficiency, irrespective of the direction of the prevailing wind. The discharge from each spray is collected in a system of troughs under the pagoda and returned to a cold well from which it is pumped to an overhead tank. The efficiency of the new system is shown by the fact that the temperature of the water from the tower outlet is usually under the dry bulb temperature, whereas the reverse was true with the older spray pond system.

Digest from "An Efficient Spray Cooling System for Sugar Mills" by H. E. B. Scriven, Proceedings of the Queensland Society of Sugar Cane Technologists 43-50 1948.

DEHYDRATION

Process for Drying Rice

REDUCING the moisture content of rice from 22-23 percent to 14-15 percent without heating to higher than 110 deg. F. is the purpose of a recently patented process using a one-pass drying apparatus.

The drier consists of a rectangular housing divided vertically into three compartments by two perforate sheets or screens. These form the central compartment containing the rice to be dried, which is fed from a hopper mounted on the housing. The open compartments on each side of the central column of rice are connected at the bottom with a source of hot air. They are also equipped with top and bottom shutters so correlated mechanically that when the bottom shutter of one compartment is open the other is closed, while the top shutters are in exactly the opposite positions.

By this arrangement, hot air blown into the bottom of one compartment must pass laterally through the center column of rice in order to exit from the top of the other compartment. The flow of air is alternated from one compartment to the other, as required.

Air at 150 deg. F. and about 8 percent RH is forced through the 9-in.-thick column of rice at the rate of 400 cu. ft. per min. per bbl. of rice. The rapid evaporation of moisture from the rice actually reduces its initial temperature so that it is not injured even though relatively hot air is used. As the rate of drying diminishes, the rice begins to get warm on the side of the column through which hot air is entering. As the temperature approaches

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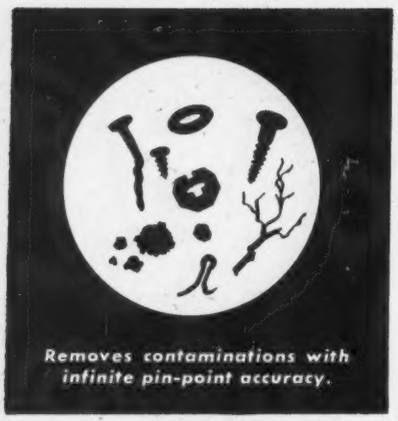

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the danger point, shown by indicating apparatus, the flow of air through the column is reversed by manipulating the shutters. The alternate operation is continued until the rice is dry, whereupon the column is discharged at the bottom and a new load introduced at the top.

Digest from U. S. Patent 2,444,588, issued July 6, 1948, on an application dated Feb. 13, 1948, to R. Bassinger and O. A. Wright, Houston, Tex.; said Bassinger assignor to said Wright.

MISCELLANEOUS

Soybean Whip

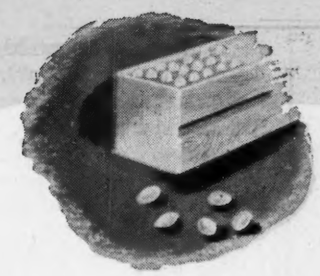
ACCORDING to recent patent specifications it is possible to prepare from soybean meal a light, foamy material similar to beaten egg whites. The product is said to be free from undesirable taste and flavor. Flaked soybeans containing 20 percent oil are first extracted with ethyl alcohol to remove about 95 percent of the oil and, incidentally, an additional 12 percent of the original bean. The residue is extracted with 3 to 10 parts water, after which the aqueous extract is filtered off. The concentration of foaming principle in this extract is such that it can be whipped to a foam by mechanical means and used for culinary purposes. Additional edible substances such as sugar, corn sirup, cooked or uncooked starch, glycerine, sodium alginate, vanilla and other flavors, salt, and flour, may be incorporated in the aqueous extract either before or after whipping.

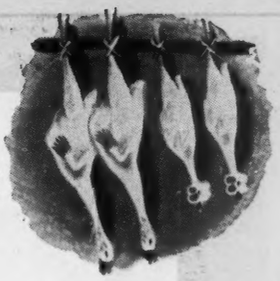
Digest from U. S. Patent 2,444,241, issued June 29, 1948, on an application dated May 21, 1946, to A. C. Beckel, L. I. DeVoss and A. K. Smith, Peoria, and P. A. Belter, Pekin, Ill., and assigned to the Unted States of America.

Flies Resistant to DDT

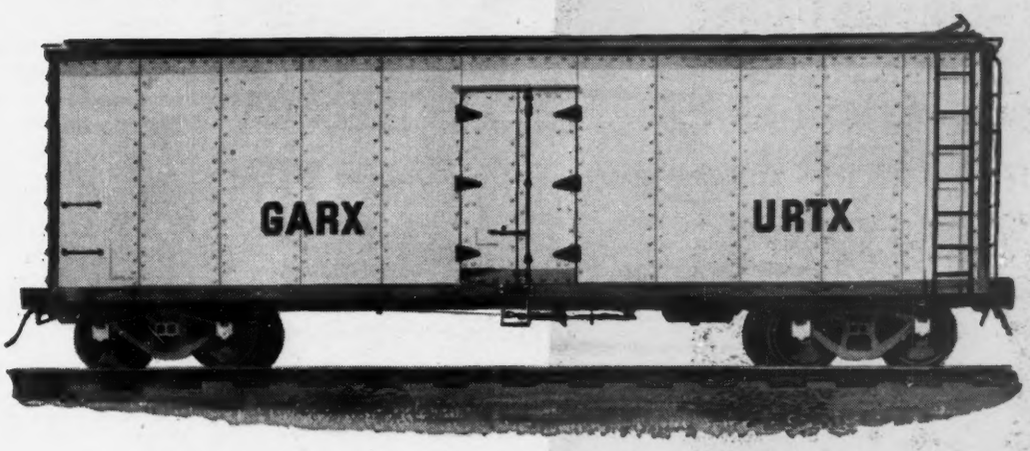
WHEN a wild population of house flies in Ellenville, N. Y. survived repeated applications of DDT residual sprays, tests were made to compare them with a laboratory line of flies that had never been exposed to this insecticide. Offspring of the Ellenville line, captured in 1928, were cultured through three generations. The laboratory line was in the 24th to 26th generation, originating in a dairy in Orlando, Fla., in 1943. Both lines were subjected to exposure to various concentrations of insecticide sprays, not only of DDT but also of DDT-pp[1] isomer, methoxy DDT, rhothane D3, toxaphene, chlordane, parathion, gamma isomer of benzene hexachloride, and tetraethyl pyrophosphate.

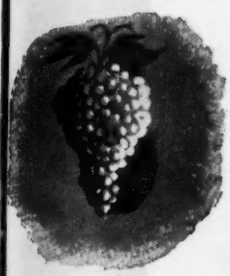
Results of the tests showed that flies of the Ellenville line, as compared with those of the laboratory line, were remarkably resistant to residues of technical DDT, the pp[1] isomer of DDT.





Along with many other specialized types of General American cars, this refrigerator car serves the nation's shippers.





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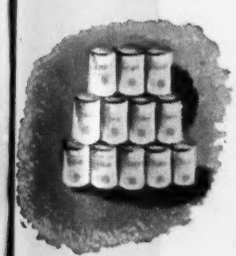
To serve you further, General American representatives located in most major producing areas are ready to help you solve your own individual shipping problems quickly and economically.

So whatever and wherever you ship, you may take advantage of General American's 50 years of experience serving the nation's shippers. And you may rely absolutely on General American's outstanding reputation for complete dependability.



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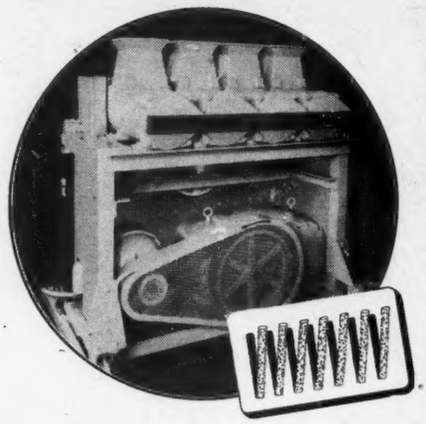

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and rhothane D3. They were less resistant to residues of methoxy DDT, and showed no resistance to residues of toxaphene, chlordane, parathion, the gamma isomer of benezene hexachloride, and tetaethyl pyrophosphate.

It appears from these results that wild flies have become resistant to DDT in some localities, and that specimens collected in the field are not normal and can not be depended on to evaluate insecticides in tests in the same way as flies collected prior to the time of the use of DDT and other insecticides.

Digest from "House Flies Resistant to DDT Residual Sprays," by Geo. W. Barber and J. B. Schmitt, Bulletin 742, New Jersey Agricultural Experiment Station, New Brunswick, N. J., August, 1948.

Air Purification

APPLICATION data on purifying and deodorizing air by means of activated carbon are contained in a short monograph of special interest to the food industries. In particular, the author discusses means and procedure for preventing or controlling the accumulation of undesirable vapors and gases within an enclosure. Every odorous substance has an "odor threshold," which is the concentration at which it can barely be detected by the sense of smell when a person enters the space in which the odor is diffused. Dilution of the odor below threshold is accomplished either by introducing odor-free air from outdoors, or by circulating indoor air through purification equipment, or by a combination of both. A table is given showing the enormous differences in threshold concentration of various substances.

Sorption of odorous vapors by granular activated carbon is the most practical method of removing them. For this purpose the carbon should have high sorptive capacity for a wide range of gases and vapors, high retentive capacity for the same, low retentivity for water vapor, extreme hardness, high apparent density, and adaptability to repeated reactivation. The wide variation in retentivity of vapors is shown in a table of about 100 substances.

The author derives a number of formulas for computing ventilation or air recovery, and gives examples of their application. A table shows the average odor-free air requirement for dilution of odors to threshold concentration. Finally, among the applications of air purification discussed in the monograph are those for frozen food locker plants, and for a variety of foods in cold storage.

Digest from "Air Purification and Deodorization by Use of Activated Carbon," by F. H. Munkelt, *Refrigerating Engineering*, Section 2, 56, 1-8, September, 1948.

BOOKS

The Year in Biochemistry

ANNUAL REVIEW OF BIOCHEMISTRY, VOL. XVII. Edited by J. Murray Luck, H. S. Loring and Gordon Mackinney. Published by Annual Reviews, Inc., Stanford, Cal., 1948. 801 pages; 6¼x9 in.; cloth. Price, $6.00.

This latest edition in a well-established series has a number of chapters that are of more than passing interest to the food chemist. Those that might be singled out for particular attention include: Biological Oxidations and Reductions by H. Weil-Malherbe; Nonoxidative Enzymes by J. B. Sumner; Chemistry of the Carbohydrates by D. A. Prins and R. W. Jeanloz; Chemistry of the Lipids by J. Folch-Pi and W. M. Sperry; Chemistry of the Proteins and Amino Acids by K. O. Pedersen; and The Vitamins by B. L. Oser.

Plastic Properties

TECHNICAL DATA ON PLASTICS. Published by Plastic Materials Manufacturers Assn., Inc., Tower Bldg., 14th & K Sts., N. W., Washington 5, D. C., 1948. 141 pages; 8¾x11¼ in.; cloth. Price, $2.50.

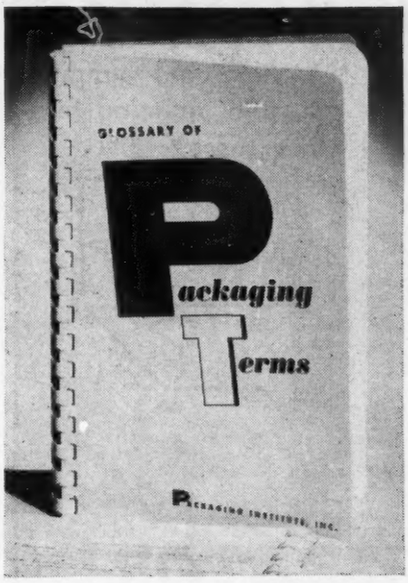
Keener competition and more exacting distribution demands are forcing the food industry to make broader searches for materials that lend themselves to improved packaging. And plastics are generally given serious consideration in any such research.

This book will help to acquaint prospective users with the properties that characterize the various available plastics. The food manufacturer will be particularly concerned with the sections describing such plastics as polyethylene, the vinyl chloride polymers and Copolymers, vinylidene chloride, cellular cellulose acetate, cellulose acetate sheets, rods and tubes, ethyl cellulose and, possibly, nylon.

AMA Packaging Series

PACKAGING STANDARDS, MATERIALS, and EQUIPMENT. 40 pages; 75c.; FITTING THE SHIPPING CONTAINER TO THE PRODUCT. 32 pages; 50c.; BETTER EXPORT PACKAGING—IMPROVED LOADING. 28 pages; 50c.; and PLANNING PACKAGE DEVELOPMENT. 38 pages; 75c. Published by American Management Assn., 330 W. 42nd St., New York City 18; 6x9 in.; paper covered.

The contents of these four booklets are indicated by their titles. They form part of the series published by AMA covering the whole broad field of packaging.



Packaging Definitions

GLOSSARY OF PACKAGING TERMS. Compiled by Gerry O. Manypenny. Published by Packaging Institute, Inc., 342 Madison Ave., New York City 17, 1948. 187 pages; 5¾x8½ in.; loose-leaf plastic. Price, $2.75.

This is a first attempt at assembling definitions of the terms used in the packaging and related industries. It represents, in many cases, a refinement of the work of trade associations, companies and individuals in the general field of packaging.

The book's compiler is chairman of the Institute's packaging glossary subcommittee and managing editor of *Packaging Parade*. According to present plans, the work will be kept up-to-date by yearly revisions.

Sugar Analysis

CHROMATOGRAPHY OF SUGARS AND RELATED SUBSTANCES. By Wendell W. Binkley and Melville L. Wolfrom. Published by Sugar Research Foundation, Inc., 52 Wall St., New York City 5, 1948. 34 pages; 6x9 in.; paper. Free.

This is another of the scientific reports in a series being published by the Sugar Research Foundation. It describes the laboratory use of chromatographic adsorption methods for the sugar group, and gives an account of some of the achievements that have resulted from such application.

These methods provide a quick and accurate means of differentiating the various carbohydrates, one from another. Application to sugars, where the components are chemically very similar, has already been proved highly successful.

The authors are engaged in carbo-

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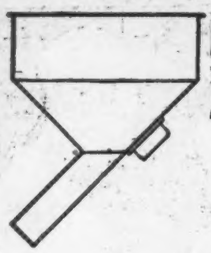
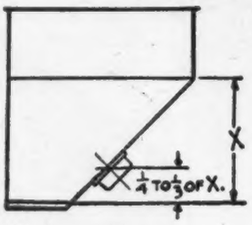
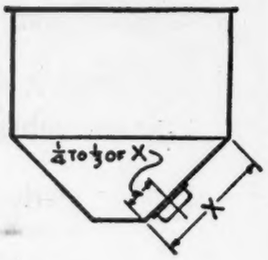


HANDLING STUBBORN MATERIALS?



Arching and hanging in, and plugging bins like these?



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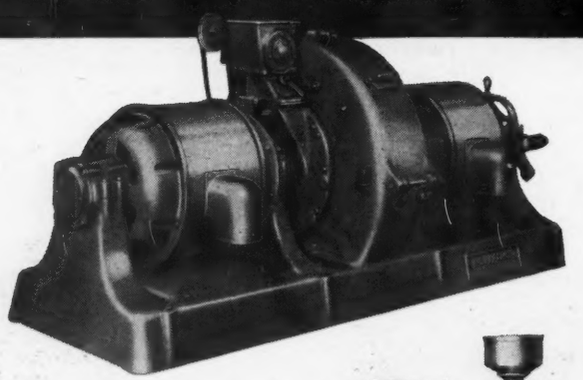

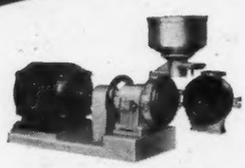

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hydrate research at Ohio State University, and are responsible for the major portion of the developments recorded in this monograph.

GOVERNMENT PUBLICATIONS

ANIMAL AND VEGETABLE FATS AND OILS, 1943-1947. Bureau of the Census, Series M17-7-07. Processed. A statistical resume of production, consumption, and raw materials of the fats and oils industry during the war and in the early postwar period.

DIRECTORY OF ACTIVITIES OF THE BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, 1947. U. S. Department of Agriculture, Miscellaneous Publication No. 645. Price 30c. Identifies all the major projects and the active personnel in the research and field staffs of the Bureau.

FISHERY STATISTICS OF THE UNITED STATES, 1944. By A. W. Anderson and E. A. Power. Fish & Wildlife Service, Statistical Digest No. 16. Price $1.00. A bound volume detailing the industry operations in the calendar year 1944. Supersedes numerous preliminary and fragmentary reports.

SOURCES AND DISTRIBUTION OF CITRUS JUICES PURCHASED BY WHOLESALE BUYERS, 1946-47. By Harry C. Hensley and Anne L. Gessner. U. S. Department of Agriculture, Farm Credit Assn., Miscellaneous Report 121. Mimeographed. A comprehensive statistical summary dealing principally with the marketing factors. Significant for those planning production.

FIELD-MODEL AEROSOL MACHINES. By A. H. Yeomans. Bureau of Entomology & Plant Quarantine, ET-258. Processed. Interesting technical information, with illustrations, concerning equipment designed primarily for farm and field use. Also applicable in some measure to indoor insect control by aerosols.

SURVEY OF FOOD AND NUTRITION RESEARCH IN THE UNITED STATES, 1947. National Research Council, Food & Nutrition Board. Price $1.00. Available only from National Research Council, 2101 Constitution Ave., Washington 25, D. C. An extremely comprehensive summary of research by Government and by educational institutions and industry.

UNITED STATES IMPORT DUTIES (1948). U. S. Tariff Commission, Miscellaneous Series. Price $2.00. Lists present effective import duties as modified by Executive action under the trade agreements law, thus superseding statutory rates fixed by Congress.

Documents are available, at prices indicated, from Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, pamphlet is free and should be ordered from Bureau responsible for its issue.

PATENTS

Non-Gumming Fruit Powder Made from Pitted Apricots—K. K. Newson, San Francisco, Cal. No. 2,444,579. July 6, 1948.

Grain Dried by Forcing Heated Atmospheric Air through Column of Grain Supported between Two Opposed Perforated Walls—Ross Bassinger and O. A. Wright, Houston, Tex.; Bassinger to Wright. No. 2,444,588. July 6, 1948.

Edges of Unbaked Pie Dough in Pans Crimped by Action of Rotating Inner and Outer Disks Mounted Face-to-Face—D. W. Smith to Colborne Mfg. Co., Chicago, Ill. No. 2,444,857. July 6, 1948.

Chewing Gum Base Made to Contain Thermosetting Resin of Urea Formaldehydes and Ketone Aldehydes in Final State of Polymerization—W. P. Cohoe, New York to American Chicle Co., Long Island City, N. Y. No. 2,444,871. July 6, 1948.

Peppers and Like Preserved by Cold Packing in Solution Containing Vinegar and Saccharine as Preserving and Hardening Agent—E. A. Hayes, South Euclid, Ohio. No. 2,444,875. July 6, 1948.

Stabilized Lecithin with High Emulsifying Power Made in Dry Free-Pouring Powder Form Free from any Tendency to Cake or Pack—W. J. Fitzpatrick to The W. J. Fitzpatrick Co., Chicago, Ill. No. 2,444,984. July 13, 1948.

Riboflavin Formed with High Yields by Growing *Ashbya gossypii* under Aerobic Conditions on Medium Comprising 0.5 to 100 Percent Fermentable Carbohydrate, Proteinaceous Material and Lipid; Also Corn Steep Liquor—F. W. Tanner, Jr., L. J. Wickerham and J. M. Van Lanen, Peoria, Ill. to United States of America. No. 2,445,128. July 13, 1948.

Riboflavin Solubility Increased by Action of 1-Tyrosine Amide and its Acid-Addition Salts—Jesse Charney, New York to Wyeth Inc., Philadelphia, Pa. No. 2,445,208. July 13, 1948.

Egg Emulsion Adjusted to 5.5 pH with Hydrochloric Acid prior to Drying and Mixed with Dry Sodium Bicarbonate to Neutralize Hydrochloric Acid in Egg Powder Preliminary to Packaging—M. M. Boggs and H. L. Fevold, Berkeley, Cal. to United States of America. No. 2,445,299. July 13, 1948.

Egg Meats Removed from Shell by Perforating Shell with Needle and Applying Suction—John Meade, Erskineville, near Sydney, New South Wales, Australia. No. 2,445,490. July 20, 1948.

Ice Cream Stabilized by use of Alkalino-Calco-Alginate—V. C. E. Le Gloahec, Rockland, Me. to Algin Corp. of America, New York City. No. 2,445,750, July 27, 1948.

Dehydrated Foods Compressed for Packaging by Forcing Through Cylindrical Sleeve Under Pressure of 1,500 lb. Per Sq. In.—N. M. Adams, Chicago, to Wilson & Co., Inc. No. 2,445,752. July 27, 1948.

Churned Egg Meats Treated With Dehydrated Phosphate to Inhibit Proteolytic Action and Coagulation—G. O. Hall, Murrysville, Pa., to Hall Laboratories, Inc., Pittsburgh. No. 2,445,879. July 27, 1948.

Onions Peeled by Action of Conical, Diverging, Hollow Jet of Gas—Geo. T. Hemmeter, Berkeley, Cal. No. 2,445,881, July 27, 1948.

Baked Bread Removed from Pans and Mechanically Deposited on Conveyor Without Tumbling on Top Crust—J. MacManus, Yonkers, N. Y., to Cushman's Sons, Inc., New York City. No. 2,445,884. July 27, 1948.

Alcohol-Soluble Oils Continuously Extracted From Vegetable Seeds and Nutmeats—A. C. Beckel, Peoria, P. A. Belter, Pekin, and A. K. Smith, Peoria, Ill., to United States of America. No. 2,445,931. July 27, 1948.

Gelatin-Like Carbohydrate, Gelose, Extracted From Seaweeds—H. J. Humm, Beaufort, N. C., to Duke University, Durham, N. C. No. 2,446,091. July 27, 1948.

Fresh Corn Blanched, Partially Dehydrated and Crushed to Alter Natural Cellular Structure Without Reducing Kernels to Finely Divided State—P. W. Salo, Minneapolis, to General Mills, Inc. No. 2,446,162. July 27, 1948.

Loaves of Sliced Bread Ground in Hammermill Preparatory to Drying in Heated Rotary Kiln—C. A. Gerber, Wayne Township, Du Page County, Ill. No. 2,446,175. Aug. 3, 1948.

Solid Fat Blended With Liquid Fat in Continuous Manner and in Way to Maintain Blended Fat in Liquid Form—B. S. Harrington, Chicago, to Armour & Co., Chicago. No. 2,446,178. Aug. 3, 1948.

Sheeted Dough Mechanically Rolled and Cut Into Units of Pre-Determined Size—C. G. Turner, Atlanta, Ga., to Turner Co., Inc. No. 2,446,201. Aug. 3, 1948.

Maple Flavor Made by Reducing Saccharide With Amino Acid—R. E. Kremers, Summit, N. J. to General Foods Corp., New York City. No. 2,446,478. Aug. 3, 1948.

Mold Growth Inhibited by Application of Esterification Product of Propylene Glycol or Dipropylene Glycol With Straight Chain Saturated Monocarboxylic Acid—S. W. Arenson, Baltimore, Md., to Doughnut Corporation of America, New York City. No. 2,446,505. Aug. 3, 1948.

Cottage Cheese With Firm Body and Soft Texture Made by Freezing and Thawing of Curd Previously Cooked to Have Rubbery Tough Body—G. C. North and L. Little, to Beatrice Creamery Co. Chicago. No. 2,446,550. Aug. 10, 1948.

Raisins Mechnically Stemmed by Device With Reciprocating Ladderlike Grids—T. W. W. Forrest, to D. R. Hoak, Fresno, Cal. No. 2,446,646. Aug. 10, 1948.

Printed copies of patents are obtainable, at a cost of 25¢ each, directly from U. S. Patent Office, Washington, D. C.

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Hydrolyzed VEGETABLE Protein
These derivatives of wheat protein are being used by many food manufacturers to
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● Simply a matter of screening . . . a useful trick for a mouse to know. In fact, screening is a useful trick in any trade. . . . even the salt business!

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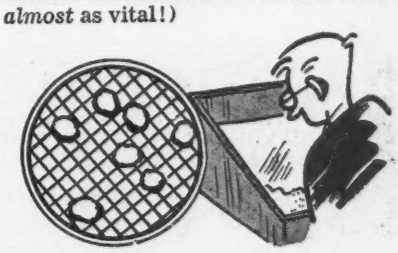
Yes, it's as vital to the butter-maker that we remove over-sized and under-sized salt crystals . . . as it is to the mouse to screen out that cat. (Well, *almost* as vital!)



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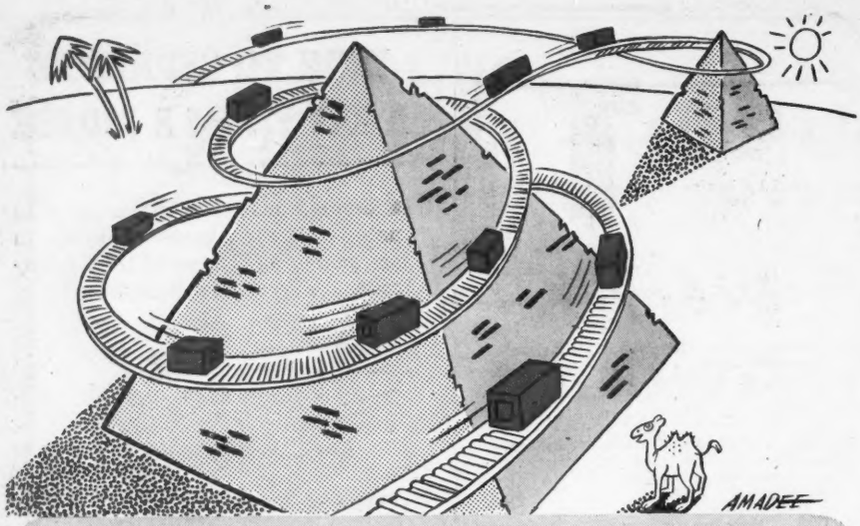

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Control of Quality

(*Continued from page 76*)

suckers will bear another pineapple. Though smaller, these will be equal to the first or "plant crop" in quality.

Normally after the second crop or "first ratoon", the plants are knocked down. Forty months have now passed since the previous stand of plants were "knocked down" as trash, and now the eight months of soil preparation begins again. In some instances, however, a "second ratoon" crop may be gathered from the same field. When this is the case, the cycle from knockdown to knockdown lasts about 52 months.

Harvesting Revolutionized

Harvesting on Hawaiian Pineapple Co.'s plantations has been revolutionized in the last two years. Previously, it was one of the most laborious and expensive of all the company's agricultural operations. Field hands, carrying a burlap bag swung over a shoulder, moved down the rows, selecting and picking the ripe fruit. When they had gathered eight or ten fruit, their bags were full. They walked out to the road and emptied their bags. The crowns were then trimmed and the fruit placed in small lug boxes—the basic unit of field production. The fruit receiving platforms at the cannery were designed to handle these lug boxes. On these platforms in the peak season, several hundred men were employed emptying boxes onto receiving conveyor belts.

A change in the harvesting methods meant a change not only in the fields, but in truck and barge transportation, and in cannery installations. But if means could be devised whereby fruit could be handled from field to cannery in bulk, the advantages were obvious.

Engineers Called

Dole engineers went to work on the problem. They designed a mechanical harvesting aid, tried it, improved it. They designed a bin to carry seven tons of fruit in a single load. And at the cannery they designed a new fruit receiving station to empty the bins mechanically.

The new harvester, now used on all but the most inaccessible fields, consists of a 50-ft. lateral boom carrying a belt conveyor and mounted on an open frame large enough to allow a 10-ton field truck to pass between its legs. Incorporated in the legs of the frame are hydraulic jacks. When a field truck carrying an empty bin drives between its legs, the frame is lowered and settles on the empty bin. Then, truck, bin, and frame move as a unit along the field road.

The lateral boom, traversing eleven

rows of plants, lies at a convenient height for the pickers who follow it. They merely select the ripe fruit, cut off the crown, and place it on the boom belt. The belt carries the harvest into the bin. And when the bin is full, the harvester operator raises the frame on its jacks and the truck and bin drive off to the transfer station. At this time, another truck carrying another empty bin immediately drives under the harvester and, with scarcely an interruption, the picking continues.

The bins, incidentally, are divided horizontally by an intermediate partition, which prevents the weight of the fruit from crushing the pineapple in the bottom.

Plantation to Cannery

On the Oahu plantations, from which fruit is trucked to the cannery, the bins are transferred from the 10-ton field trucks to 20-ton semi-trailers carrying two bins each. The transfer is made by specially designed Ross straddle trucks. At the transfer stations, the field trucks pick up empty bins and immediately return to the fields. Turn around time is about two minutes.

Fruit from Lanai is taken directly from the fields to the nearby harbor. There, bins are swung by crane to waiting barges. After the 60-mile voyage to Honolulu, they are unloaded—again by crane—to trucks which haul them to the cannery.

Employees

Approximately 2,000 regular hourly paid employees work all year round on the company plantations. During the summer months, however, when harvest operations reach their peak, about 1,000 additional employees are required.

Employees in the Hawaiian pineapple industry are among the highest paid agricultural workers in the world. Hourly wages for men on the plantations range from 97¢ to $1.77¢ per hour. Benefits sponsored by Hawaiian Pineapple Co.—an annual minimum of two weeks vacation with pay, low premium group insurance, a retirement plan, and substantial sick pay benefits—add considerably to the compensation received by its employees.

Plantation Housing

The company is now in the midst of a plantation housing project that will eventually cost several million dollars. Modern transportation and advances in agricultural mechanization have eliminated the need for workers and families to live in outlying camps.

As part of its progressive housing program, the company discontinued the system of perquisites, traditional on Island plantations, and raised agricultural wages to parity with urban rates.

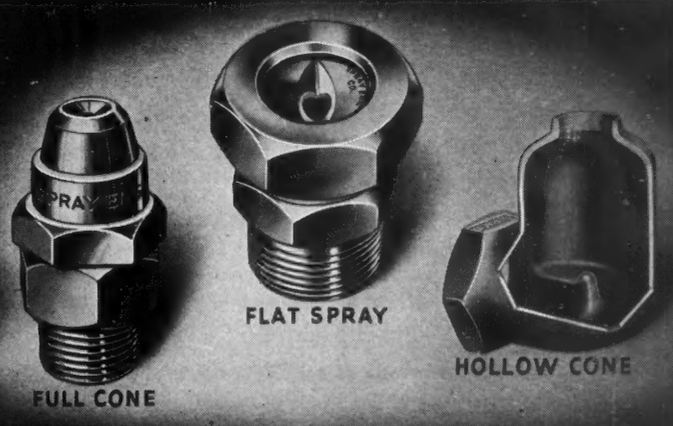
STEEL

Every Kind
Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

RYERSON

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco



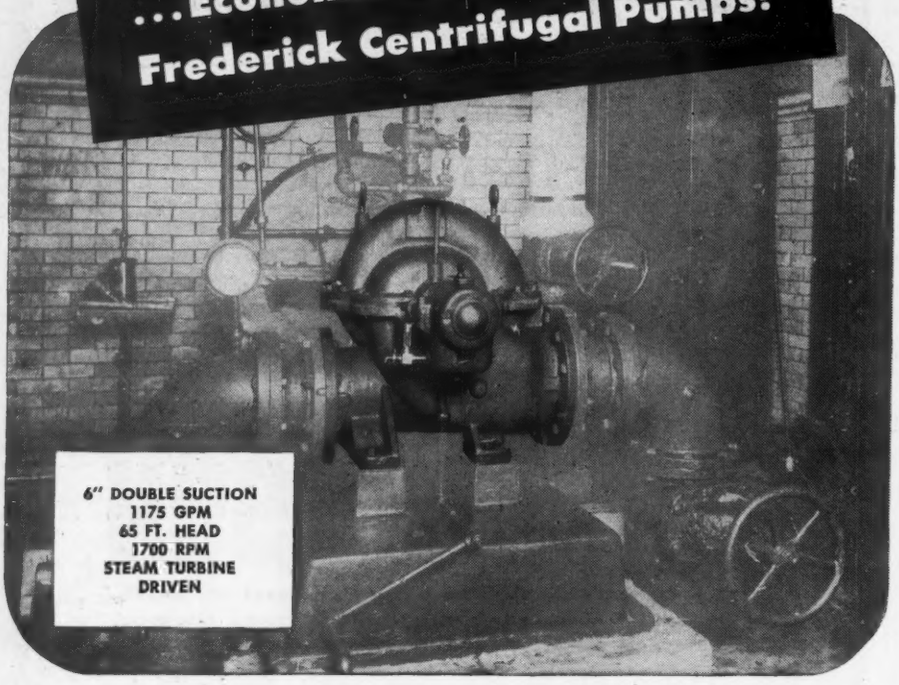
SPRACO NOZZLES

Write for NOZZLE CATALOG to

SPRAY ENGINEERING CO.

128 CENTRAL STREET • SOMERVILLE 45, MASS.

GET EXTRA LONG LIFE
...Economical operation from Frederick Centrifugal Pumps!



Twenty-nine years ago, Frederick Iron & Steel manufactured its first centrifugal pump . . . a 6" Double Suction Volute type. Delivered in July, 1919, this pump is still in operation today at the Dominion Coal Co. in Sydney, Nova Scotia. Minor repair parts over the 29-year period have been furnished promptly by Frederick. Today, Frederick Iron & Steel is manufacturing a complete line of single and double suction, single and multi-stage centrifugal pumps with the same long-lasting quality built into its first unit. When you buy Frederick pumps you're assured of continuous, economical operation from extra long life.

We have among our designs just the centrifugal pump you're looking for. Drop a line to the address below and we'll gladly send you an attractive, illustrated "file-size" brochure on our pumps as well as the name of our factory representative nearest you. Ask for Bulletin 104.

Frederick
ESTABLISHED 1890
IRON AND STEEL, INC.
Department P-3 REPRESENTATIVES IN PRINCIPAL CITIES Frederick, Md.

ALSO MANUFACTURERS OF FRECUT AND FREFORM METALWORKING MACHINERY, FREDERICK STOKERS AND ASH CONVEYORS AND A COMPLETE LINE OF GRAY IRON CASTINGS.

Company-owned houses were then leased to a non-profit organization—the Dole Community Trust—which, in turn, has made them available to employees at minimum rentals.

For its employees on Lanai, the company provides the public services enjoyed by members of any modern community. In addition to maintaining and operating the necessary power and water services, it also provides free transportation for employees to and from the larger nearby island of Maui.

Also, those employees who wish to keep small vegetable gardens may do so on their own house lots or without charge on land made available on the outskirts of the town. Consistent with its policy of encouraging a spirit of independence among its employees, the company does not operate retail stores on its plantations. Business property is made available at low rents to private individuals.

Employee Relations

The activities of the industrial relations department of the company extend through every phase of the Island operations. Each job on the plantations, as in the Honolulu cannery, is described, evaluated and classified. Hourly rated jobs on the plantations alone include approximately 165 different titles.

In the past year, the plantation staffs and the industrial relations department have cooperated in carrying a company-wide information program to all employees. Graphic charts and simple, clear explanations told men in the fields and in the plantation shops how the company's income is spent and exactly what company-sponsored benefits are available to them. Plantation department superintendents, foremen, and "lunas" (Island term meaning "strawbosses") met in small conference groups to discuss means of improving employee relations. The handling of grievances and the administration of house rules were among the topics fruitfully threshed out by these supervisory conference groups.

The industrial relations department has also sponsored an extensive interdepartmental athletic program in which women employees, as well as men, participate. Departmental "luaus" (feasts in the Hawaiian manner), company harvest dances, and company-encouraged children's programs are other off-the-job activities that bring the members of the company community together.

The growth of this modern American community, comprising people of Hawaiian, Oriental and European ancestry, is a tribute to the industry of its members, as well as to the company and the free society under which it has prospered.

Nutritional Improvement

(*Continued from page* 115)

method regulating enrichment. If such a policy is followed, it would seem that the occasions where a food would have to be standardized by the F&DA because of extra nutritional value should be rare.

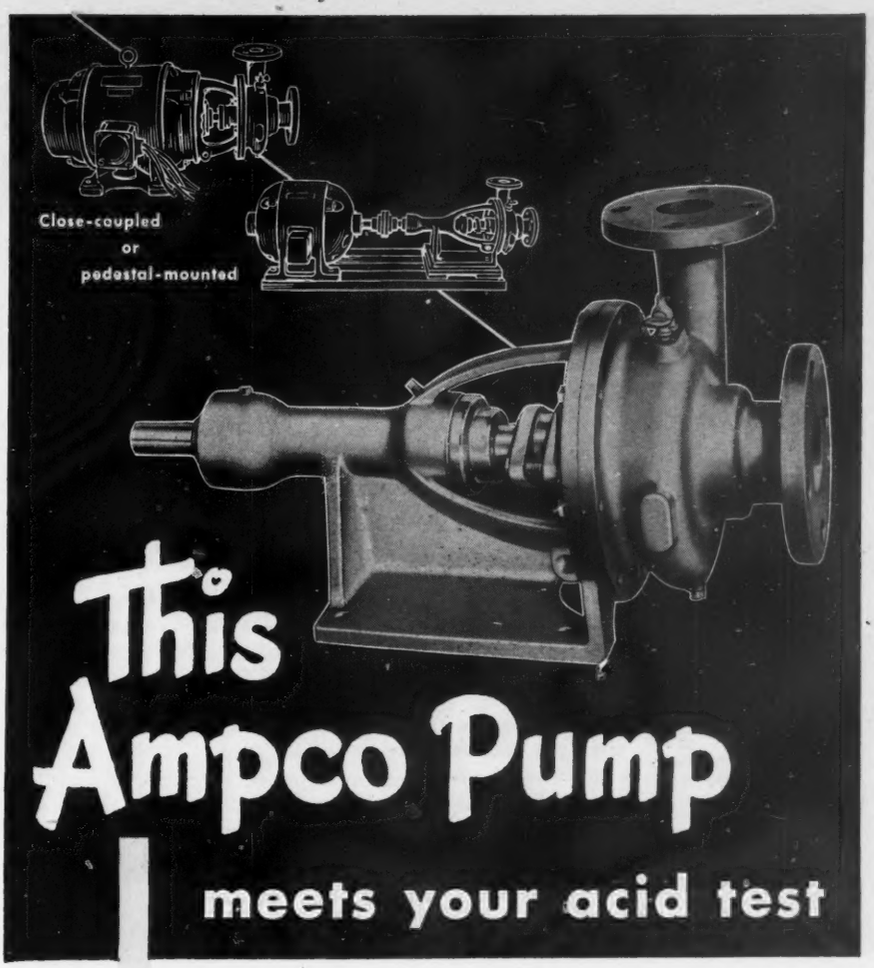
On the other hand, it is to be hoped that F&DA will recognize that the dangers of confusion with respect to the enrichment of foods may be exaggerated in some instances and that such enrichment presents no health or nutritional hazards; and thus, that it will not exercise its standardizing power in a way to deprive food manufacturers and processors of their opportunity to make reasonable experiments in the nutritional improvement of their foods. When more is known about the human requirements for these various nutritional factors and how they function in the body, both industry and the Administration will be in a better position to proceed on the basis of this knowledge if there are not too many hampering restrictions which may have to be changed or eliminated in the light of this new knoweldge.

Must Work With F&DA

It is, therefore, apparent that the most important problems which face the producer of nutritionally improved foods will have to be worked out with F&DA. He will find that the Administration will be glad to render assistance to him—or to his attorney—in connection with any particular labeling problems which may arise concerning statements permitted or required on the label. The Administration may be approached either by letter or by personal visit at the headquarters in Washington, or at the various field offices.

It might be mentioned that the Federal Food, Drug and Cosmetic Act contains labeling provisions of general application to all foods, whether nutritionally improved or not. As food processors have been made familiar with these requirements they are considered beyond the scope of this article and no attempt has been made to review them.

Once the food processor has decided on the proper labeling of his food, he will, of course, wish to take steps to make the product known to the general public and this will be done through advertising. As previously mentioned, the Federal Trade Commission supervises advertising as such. The Federal Trade Commission Act, as amended, gives the Commission power to prevent misrepresentations with respect to all products sold in commerce. Basically this law requires only that an adver-



— a corrosion-resistant pump sold as a standard model without a price premium

You don't have to pay extra for special production to get a corrosion-resistant pump. Ampco's aluminum bronze centrifugal pump is a standard model — at standard-model prices.

With this new pump, you can cut the cost of original equipment, reduce replacement frequency, and be sure of efficient handling of your corrosive and erosive thin liquids. Its corrosion-resistance prevents contamination. All passages are designed for smooth, quiet flow. Grades of aluminum bronze are varied to give maximum efficiency at each point. Operation in a 500° F ambient does not change its physical properties. It is the only bronze pump that can be welded or overlaid—Ampco-Trode 10 electrode matches the base metal perfectly.

Actual performance records prove the value of this pump in breweries, and in petroleum, chemical, and food processing industries. See your nearby Ampco engineer for full details. All sizes are available either pedestal-mounted, or close-coupled to a face-type motor. Write for bulletins.

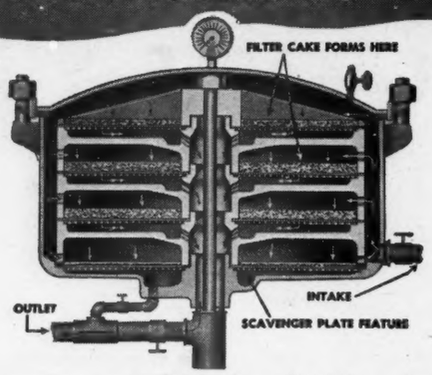
Ampco Metal, Inc.

Dept. FI-12 • Milwaukee 4, Wisconsin

FOR HIGH SPEED, UNIFORM FILTRATION
REQUIRED IN FOOD PROCESSING

SPARKLER
horizontal plate
FILTERS

Capacities 50 G.P.H.
to 5000 G.P.H.



HERE ARE A FEW FOOD PRODUCTS THAT SPARKLER FILTERS HANDLE WITH EASE:
Candy Scrap
Chicken Broth
Cider
Egg Albumen
Extracts
Flavors
Honey
Gums
Liquors
Milk
Molasses
Vegetable Oil
Syrups
Vinegars
Wines
Fruit Juices
Alcohols
Alkalies
Beverages

Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

We invite correspondence on your problems. You will receive the advice of filtration engineers with over a quarter of a century experience in a specific field.

SPARKLER MANUFACTURING COMPANY
MUNDELEIN, ILLINOIS

RIETZ MAGNALIFT

From warehouse storage on pallets . . . to RIETZ Magnalift . . . to labeler and caser — an efficient mechanized operation using **one** operator. Magnalift reduces handling costs and minimizes dents by transfering cans from pallet to receiving belt layer by layer, at **two** to **three** times the rate for manual unloading with **four** men. Savings made with equipment illustrated can pay for this installation in one year.

TECHNALECTRIC COMPANY
441 FOLSOM STREET • SAN FRANCISCO, CALIFORNIA
Division of Jos. Wagner Mfg. Co.

tiser shall tell the truth about his product, and nothing more than the truth. If a product is nutritionally improved by retention or restoration of a vitamin or mineral factor, the manufacturer can make a truthful statement to this effect. It would seem inadvisable in most instances for him to make any claim for benefits from use of such a product beyond a statement that the food is a "good" or a "rich" source of the nutritional factor involved. Whether or not the product is a "good" or "rich" source would depend upon the amount of the nutritional factor present. The FTC would probably object to any claim beyond this as amounting to a misrepresentation, on the ground that the factor is present in such a small amount that it could not supply any appreciable nutritional values on which such additional claims could be based.

Restrictions Insisted On

In those cases where the dietary factor is present to the extent that the food may be recommended for the purpose of rectifying conditions caused by lack of the ingredient, FTC has taken the position that any representation in this respect must be expressly limited to those cases in which the conditions mentioned are due to a deficiency of the ingredient involved. In addition to this requirement, the Commission has in recent still pending cases further stated that an advertiser of such product must also disclose that the conditions listed are "frequently due to other causes," if such is the case. The Commission's reason for insisting on such explanation is that without such disclosure the advertisement does not tell the whole truth and is misleading. The new philosophy set forth by the commission in these recent pending cases requires an advertiser to tell his audience the reasons why he should not buy his product in addition to the reasons why he should buy it. Whether or not the Commission will be sustained by the courts in its position in this point still remains to be seen.

It has long been the law that an advertisement as a whole may be completely misleading although every sentence separately considered is literally true. An advertisement telling the whole truth about why the public should buy a certain product could not be condemned by virtue of this principle of law. Thus, it seems clear that this new philosophy of the Commission condemns that which would have been in compliance with the law as previously interpreted. Pending a final decision of this matter in the courts, those companies that wish to avoid controversy with the Commission would probably be well advised to abide by its

rulings in preparing their advertising claims.

It was mentioned earlier that some advertising material may be properly considered as subject to the jurisdiction of both FTC and F&DA if it "accompanies" the food product. If such advertising material meets the requirements of the Commission, as outlined herein, it would undoubtedly be found to comply with the provisions of the Federal Food, Drug and Cosmetic Act.

—End—

Groundnut Project

(*Continued from page* 91)

water berths and facilities for bulk handling, also about 150 miles of railroad and thousands of miles of truck roads.

Every care is being taken to avoid exhausting the fertility of the soil. A comprehensive research study will determine the best system of crop rotation and the fertilizer requirements for the different types of soil. Where plant nutrients are found deficient, they will be added and minerals taken from the land by cropping will be replaced.

In addition to the agricultural and construction phases of the program, there is an educational factor. Since the whole cycle of agricultural operations will be mechanized, using fleets of tractor-drawn equipment, the unskilled native working force will be trained to take on the jobs of motor-mechanic, surveyor and technician. Many candidates are coming from the government's ex-servicemen's training schools. The ultimate long-term goal is that the project be operated entirely by the Africans themselves, perhaps on a cooperative basis.

The operators feel assured of the ultimate success of the program in adding substantially to the world supply of edible oils.

—End—

Pretzel Output

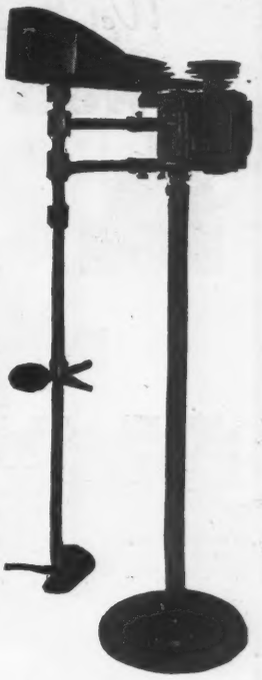
(*Continued from page* 83)

numbered 1, 2 and 3. Those girls making the best marks were selected for the first team, while those with the next highest scores were assigned, in order of their marks, to the second and third teams. And after the teams were filled, the rest of the girls were classified on the regular rate.

In actual operation, the girls are graded on their performance every four weeks and, if these records warrant it, they are then reassigned. For

New! **TERRISS 3-SPEED**

PORTABLE MIXER



STIRS • BLENDS
MIXES • AGITATES

No more carrying heavy mixer . . . clamping to tanks . . . breaking side walls.

The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.

Send your order today . . . money-back guarantee.

TERRISS • • • • DIVISION OF *Consolidated Siphon Supply Co., Inc.*

MANUFACTURERS SUPPLYING THE PROCESSING INDUSTRIES

DEPT. F, 22-24 WOOSTER ST. **NEW YORK 13, N. Y.**

WHAT YOU SHOULD KNOW....

. . . about PROMULSIN POWDER

The most up-to-date food thickener and emulsifier • Easy to handle—economical in use • Forms thick, inert, tasteless gels • Represents an improvement on methyl cellulose, being a more quickly soluble cellulose derivative (poly-galacto-xylose) • Every batch controlled by independent analysis • Applications include: Soup and Gravy Powders, Chutneys, Mayonnaise, Purees, Cordials, Pie and Pastry Fillings, Fat Extenders, etc • Samples and details on request.

. . . about ESTAX EMULSIFIERS

These consist of a wide range (Nos. 1 to 40) of poly-alcohol fatty acid esters. Representative selection, of many uses in the Food Industry:

ESTAX No. 1
(Pentaerythritol Mono Stearate).

ESTAX No. 22H
(Propylene Glycol Mono Palmito-Stearate).

ESTAX No. 5
(Glyceryl Mono Stearate).

ESTAX No. 20H
(Propylene Glycol Mono Steatrate).

ESTAX No. 32
(Pentaerythritol Di Palmito-Stearate).

Details and samples on request.

"SOLVIN" Range of Solvents. A series of solvents for foodstuffs, etc. (e.g. "SOLVIN' C. is a water-miscible higher alcohol derivative specially suitable for essence manufacture).
"WATFORD" Methyl Cellulose. For all types of thickening and suspending purposes.

Let us know your requirements

WATFORD CHEMICAL CORPORATION

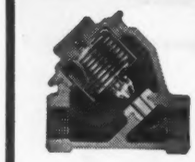
25 West 44th Street, New York

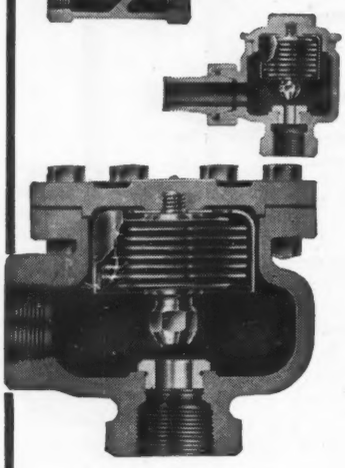
***Telephone:* Vanderbilt 6-0171**

We Invite You TO TEST NICHOLSON STEAM TRAPS FOR

Lowest Steam Loss

Largest Capacity





See why an increasing number of America's leading plants are standardizing on Nicholson traps. Test trap gladly sent.

Comparative tests by large trap users show: record low for steam waste; 2 to 6 times average drainage capacity; operate on lowest temperature differential; no freeze-ups; greater simplicity (fewer spare parts to stock). 5 types for every purpose; size ¼" to 2"; pressure to 225 lbs.

HIGH-PRESSURE FLOATS

Stainless, monel, steel, or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. 2-day delivery. BULLETIN 348.

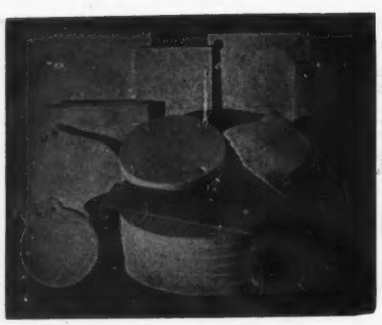
BULLETIN 1047
or see Sweet's

W. H. NICHOLSON & CO.

193 OREGON STREET, WILKES-BARRE, PA.

Filpaco

FILTER PAPERS



- Analytical Papers
- Industrial Papers
- Qualitative Papers
- Folded Papers

Manufactured from the finest materials under the most rigid specifications to meet the requirements of the FOOD FIELD . . . papers in light and heavy weights . . . with slow and fast filtering speeds . . . large stock maintained for immediate delivery . . . samples furnished upon request for experimental purposes.

Write for further information

Other "Filpaco" Products: Filter presses, fillers, storage and mixing tanks, fittings, conveyors, pumps, filter cloth and bags, filter aids, asbestos pads.

THE FILTER PAPER CO.

2450 S. Michigan Avenue Chicago 16, Illinois

example, team girls may be upgraded to a higher team or downgraded to a lower one, or machine girls may score high to win elevation to a team position, replacing girls taken off team work and downgraded to regular rates.

The performance mark is based on individual production, and on neatness, attendance, and general attitude. The company foremen keep the records, judge the teams, and determine the competitive positions of each team.

Incentive is a big feature in the system, and it is derived from several factors. Psychologically, everyone likes the distinction of being "out in front" or a leader. Primary, however, is the fact that the girls who are on Team No. 1 get the best production-line positions—those giving them an opportunity to make more money. And Team No. 2 girls have more lucrative positions than the workers on Team No. 3. When they hand-pack on a piecework basis, the girls are paid per dozen of an item packed.

Sometimes there is need for greater production from the pretzel twisting machines and accordingly more work to be done on the automatic filling and weighing units. In these periods, girls on the third teams, or even second teams, are taken from their piecework jobs and assigned to operate machines until the necessary orders are filled. This temporarily puts these girls on regular-rate pay. But the Team No. 1 girls remain at their high-paying piecework—which means an added incentive for making, and staying on, Team No. 1.

Facts Revealed

Several pertinent facts were brought out by careful study of the results of the vocational aptitude tests. Some employees who were doing only average work came up with very high aptitude scores—an indication that they were not doing their best in their assigned jobs. With this knowledge from the tests, the company then moved to place these girls more satisfactorily—that is, put the right girl in the right job.

The main object of this type of testing is to get an indication as to what the girl is best fitted for, as well as to get a prior-gage of her ability to pack pretzels.

Interesting "by-products" of this testing are the traits exhibited by some girls when they are taking the tests "under pressure" and working against time. Extreme nervousness, talkativeness, temper flare-ups, and other psychological quirks have been noted, and they have a bearing on the personality score.

In the few months of operation since installation of the testing system, pro-

duction not only has risen more than 15 percent but is continuing upward as the company continues to capitalize on the incentive spirit aroused. Introduction of various awards are now contemplated to maintain this healthy spirit.

Morale throughout the plant is much higher because of the judicious job placements prescribed by test results. Meantime, company efficiency is up because unsuited persons are "weeded out" when their test scores indicate they lack the basic qualifications to do the specific job. Money is saved because this "weeding" is done beforehand. Thus costly try-outs and failures on the line are avoided.

Certain simple basic requirements must be met by a company when it applies to the U. S. Employment Service for installation of a USES vocational test system. One clause in the "no charge" contract stipulates that an organization must first agree not to pass on to others any of the specific test information or details of the procedure.

In short, the tests are restricted to sole use by the company contracting with USES. Thus, chances of mis-use of the tests are obviated and the high standards of the system are protected.

—End—

Meatball Operation

(*Continued from page* 81)

ing and casing department, where they are made ready for immediate shipment or held in temporary storage.

Absence of pillars and other structural obstacles in the processing areas permits location of each equipment unit in such manner as to obtain the shortest travel between the different operations and to eliminate interference with movement of wheels, trucks and dollies. Moreover, the maximum use of floor space thus afforded allows addition of extra employees without hampering movements, also readily permits installation of new equipment for increased production.

A prime measure of the advantages already obtained in the new plant—over operations in the older plant—is the increased production. Now, over 600 cases of 1-lb. cans (24 per case) are put up daily by 18 employees. Formerly, only 130 cases were produced daily by 25 employees.

Furthermore, there is a potential additional increase in production of between 100 and 150 percent by approximately doubling the number of present employees—that would be without adding more equipment. If, and when, the demand for increased production appears to be relatively per-

DETECTO SCALES

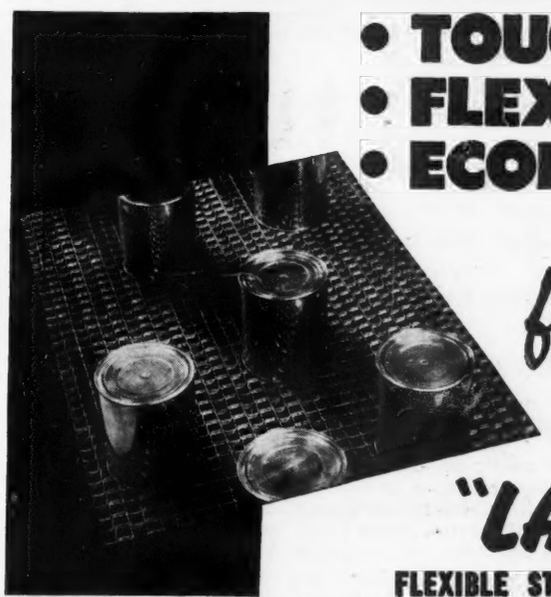
There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM HIGH ACCURACY SCALE

Another Detecto-Gram Scale for your *precision* weighing jobs. Use this Detecto-Gram Another Detecto-Gram Scale Super Sensitive Model #74-02 where hair-line accuracy is essential, where an error in the smallest fraction of an ounce may affect your profit.

Write for Catalogue

DETECTO · SCALES · INC.
MAKERS OF FINE SCALES SINCE 1900
544F PARK AVENUE • BROOKLYN 5, N. Y.
SCALE ENGINEERS IN ALL PRINCIPAL CITIES



• TOUGH
• FLEXIBLE
• ECONOMICAL

for Every Process

"LA PORTE"

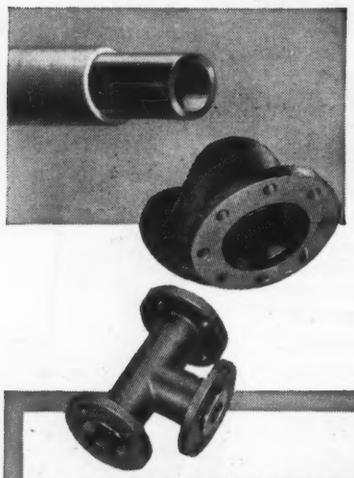
FLEXIBLE STEEL CONVEYOR BELTING

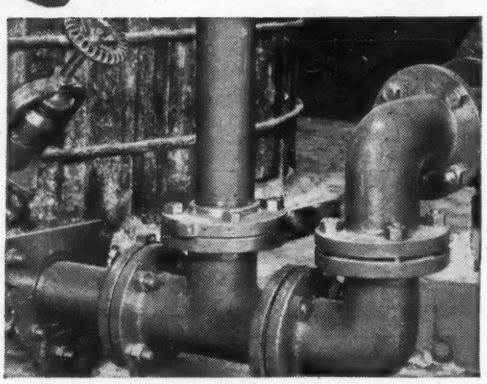
From bin to shipper, La Porte Flexible Steel Conveyor Belting carries the load with efficiency—economy—and ease. Its resilient steel mesh construction withstands the impact of load . . . maintains a perfectly flat surface without stretching, weaving, slipping or jumping . . . and allows free circulation of air and liquids around products in process. It requires no special dressings and is not affected by moisture or extreme temperatures.

Write your Supplier TODAY for La Porte Conveyor Belting. It is available in any length—almost any width.

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

saran lined steel pipe





resists corrosion

- reduces shut-downs and lost production!
- saves time and labor!
- readily field-fabricated!

The conveyance of corrosive liquids can prove as hard on profits as it is on equipment. Saran Lined Steel Pipe is designed and constructed to protect YOUR profits. It combines the desirable features of steel pipe—rigidity and pressure strength—with Saran's unusual resistance to most corrosive chemicals, solvents, and erosion. Another advantage is ease of field fabrication. For general service, Saran Lined Steel Pipe can be used at temperatures between —40° and 190°F.

Saran Lined Steel Pipe comes in maximum lengths of 10 feet and in sizes from 1 to 4 inches. Plug valves and fittings, also Saran Lined, include elbows, tees, companion and reducing flanges, and gaskets. AVAILABLE IMMEDIATELY. Write us today for further information concerning Saran Lined Steel Pipe and how it can solve your problem. Manufactured by The Dow Chemical Company, distributed nationally by Saran Lined Pipe Company.

SARAN LINED PIPE COMPANY
702 Stephenson Building
Detroit 2, Michigan

Offices in: New York • Boston
Philadelphia • Pittsburgh • Chicago
Tulsa • Indianapolis • Houston
San Francisco • Los Angeles
Portland • Seattle • Toronto

DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

manent, the company can meet and maintain it by the installation of conveyors and other units, thus reducing manual labor and thereby making unnecessary the hiring of so many new and inexperienced employees.

—End—

Fumigation

(*Continued from page* 109)

into cartons, entrance hole of the insertion tube into the carton is taped gas-tight. This practice gives assurance that the tested box is a satisfactory "control" having no more apertures than the neighboring cartons.

Many Uses

To check the kill in multiwall bags, the cages are inserted through the wax-dipped seams inside the plies, without breaking the thread or puncturing the paper.

Used bags sometimes harbor insects that could be killed by thorough fumigation and thus be prevented from infesting feeds and foods. Tightly baled bags can be tested by driving a long tube into the center of the bale.

When no aisle in the storehouse is available to allow the planting of cages in desired positions, cages can be driven through the walls to reach the location. The holes may later be plugged with a rivet or otherwise filled.

Small cages can be tied on strings and hung over rafters or pipes to test spot fumigations in elevators, conveyors and other food machinery. Moreover, fumigating chambers can be fitted with permanent openings through which the cages can be inserted and withdrawn at desired intervals.

For box car fumigation, a test cage is fastened to a flexible Saran tube and inserted through a hole in the floor. In this manner the car can remain sealed. The tube may be withdrawn at any time to determine the result of the procedure.

—End—

Packaging Materials

(*Continued from page* 97)

tons was the objective of the tests shown in Table VI. These tests were made with carton-packed prime steam lard stored at common warehouse temperatures of 65-70 deg. F. Although the parchment liner used inside the package was of the greaseproof type, relatively large surfaces of the lard were exposed to potential oxidation through creeping of the lard into the folds of the liner. This weakness in the package resulted in those exposed

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Nine of the twelve largest baking companies buy Riegel Papers regularly

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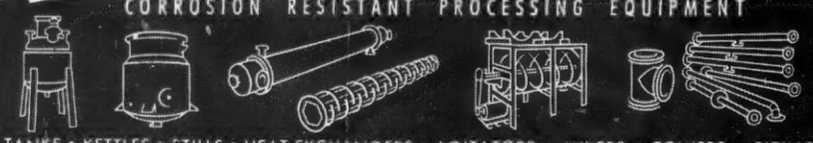

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lard films becoming rancid rather quickly.

When citric acid and gum guaiac were used in the sizing bath during the making of the parchment, the keeping quality of the lard packaged in the parchment increased between 5- and 10-fold, even though the treatment does not prevent lard from creeping into the folds of the paper.

Table VI shows the results obtained by treating the parchment liner with gum guaiac. Other tests not covered by Table VI indicate that gum guaiac on the surface of either glazed or parchment paper greatly improves the keeping quality of lard packaged in parchment-lined cartons.

From the results of these tests, there is no difficulty in concluding that the use of anti-oxidants in cardboard and in the coating of cardboard and papers offers an effective solution to the development of rancidity in fats and fat-containing foods packaged in cartons and paper wrappers.

—End—

Quaternaries

(*Continued from page* 100)

bath of 200 ppm. (1-5,000) quaternaries sanitized as efficiently as one of an equal concentration of an approved sodium hypochlorite sanitizer. This result was observed both in waters containing added calcium and in hard waters.

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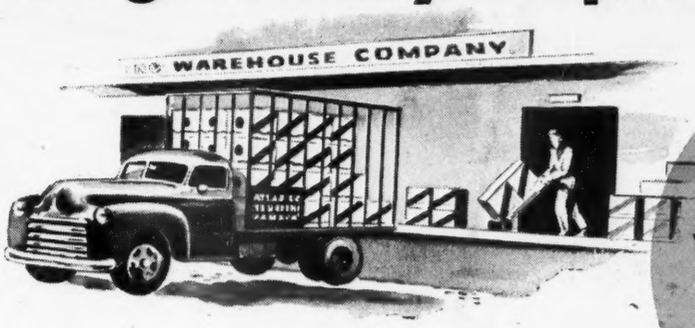
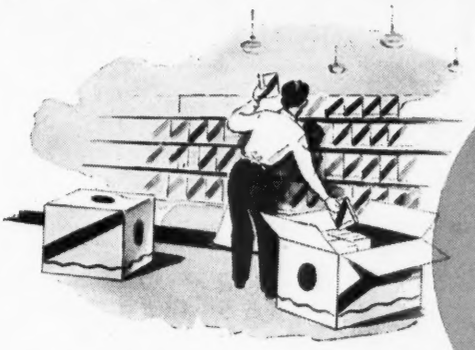


In the warehouse and on trucks



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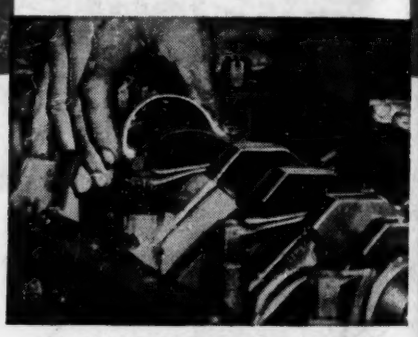

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